U.S. ENVIRONMENTAL PROTECTION AGENCY

TECHNICAL ENFORCEMENT SUPPORT

AT

HAZARDOUS WASTE SITES

TES X

CONTRACT NO. 68-W9-0007
WORK ASSIGNMENT NO. R05068

FINAL PRELIMINARY ASSESSMENT/ VISUAL SITE INSPECTION

FOR

CONTACTS METALS WELDING, INC.
EPA ID#: IND 089 263 412

IN

INDIANAPOLIS, INDIANA

U.S. EPA REGION V

METCALF & EDDY
PROJECT NO. 153068

WORK PERFORMED BY:

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EXECUTIVE SUMMARY

Under the Technical Enforcement Support (TES X) Contract, Metcalf & Eddy was tasked by the U.S. EPA to conduct preliminary assessments and visual site inspections (PA/VSIs) at various RCRA facilities to determine and evaluate the existence and likelihood of releases from solid waste management units (SWMUs) and/or areas of concern (AOCs). This report summarizes the results of a PA/VSI performed at the Contacts Metals Welding, Inc. facility in Indianapolis, Indiana (IND 089263412) and assesses the potential for releases of hazardous wastes or constituents from SWMUs and/or AOCs.

The facility is located west of the metropolitan center of Indianapolis in Marion County in central Indiana. From 1978 to present, the facility has been operated by CMW as a non-ferrous metals forming and plating company. A similar operation was conducted at the facility by P.R. Mallory from the 1920's to 1978. General facility processes include sintering, cladding, plating and alloying of powders. CMW specializes in non-ferrous metals powder metallurgy but also manufactures some products from alloy and coil stock. CMW products include electrical contacts, switches and other electrical devices used in various industries such as aerospace and government weaponry.

CMW is regulated under RCRA as a generator. Wastes generated from various manufacturing, cleaning and plating processes are numerous (See Table 1: CMW Inc., Hazardous Wastes By Generating Process and Waste Code). All wastes collect in drums or are pumped into drums at the source. When full, the containers (usually 55 gallon) are transported to drum storage areas where the waste is analyzed. After waste analysis, the drums are labelled and manifested off-site for proper disposal or reclamation.

Eighteen (18) SWMUs and five (5) AOCs were identified at this facility during the VSI and are listed below:

Solid Waste Management Units:

1. Silver Cast Unit.
2. Pickling and Rinse Tanks.
3. Tumbling and Cleaning Area.
4. Parts Washers.
5. Former Degreaser.
6. Etch Bath.
7. Degreaser.
8. Powder Mix Area.
9. Plating Lab.
10. Plating Shop.
11. Plating Solution Waste Storage Area.
12. Final Silver Cleaning Unit.
13. Drum Storage Area in Building 3.
14. Drum Storage Area in Building 4.
15. Former Drum Storage Area.
16. Contaminated Soil Waste Piles.
17. Sewer System-Building 1.
18. Sewer System-Building 3.

Areas of Concern:

1. Loading Dock.
2. Engineer Test Area.
3. Ultra Sonic Degreaser.
4. Indoor Drive-in in Plating Shop.
5. Graphite Room.

All SWMUs and AOCs are currently active with the exception of the former degreaser (SWMU #5) and the former drum storage area (SWMU #15). SWMU #5 is still located in Building 1 of the facility but has been out of operation since March of 1991. SWMU #15 was used by CMW as a staging area for empty drums from 1978 to 1987.

Releases were observed at the facility during the VSI conducted on November 12, 1992. Spilled metallic powders from the powder mix area (SWMU #8) were noted on the floor of Building 1. Spills of sodium nitrite were noted on the floor and on the tanks in the etch area (SWMU #6) in Building 1. Floor stains were noted around tanks in the cleaning and tumbling area which could originate from a variety of cleaning solutions (SWMU #3). Staining was also observed in the pickling and rinse area (SWMU #2) tanks and concrete pad in Building 1. White precipitate was noted on a nickel plating bath tank in the plating lab (SWMU #9) in Building 3. Oil-like stains were observed in the drum storage area in Building 4 (SWMU #14) and indoor drive-in in the Plating Shop (AOC #4). A black stain was also noted on the concrete floor near the degreaser (SWMU #7) during the VSI. Floor stains and tank stains from various plating solutions were observed in the plating shop in Building 3 (SWMU #10). A sewer drainage channel runs under these tanks (SWMU #18) which funnels all drippage to the sewer. Rust colored solids were observed in these channels during the VSI.

A foul odor was reported by a facility employee who was working the degreaser in 1989. Shortly thereafter, the degreaser was moved to another area and the air was tested by an OSHA representative. No contaminants were detected by OSHA during this testing.

Soil stains covering an area of approximately 900 square feet were noted in the former outdoor drum storage area during an IDEM inspection conducted on January 1, 1986. During the VSI, a site representative stated that a former P.R. Mallory employee was authorized to dump drums containing degreasing solvents in the former drum storage area when drums were in demand. The employee described these spent solvents as chlorethene and trichlorethene. Analyses of soil samples collected in this area revealed numerous volatile organic compounds above the TCLP allowable levels such as trichloroethlene (48 ppm) and trans-1,2-dichloroethylene (1.3 ppm). In December of 1990, approximately 400 cubic yards of contaminated soils and an underground gas storage tank were excavated from the area. However, CMW discontinued excavation when it determined that solvent concentrations in the soil were increasing with depth and further excavation would undermine the foundations of adjoining buildings.

Other documented releases from the facility include a drum spill in the loading area in March of 1992 and sewer releases above pH levels in 1989 and 1990.

There is a moderate potential for facility workers to come into contact with hazardous wastes at the facility due to deteriorating building structures, inadequate containment of wastes and a lack of enforcement of precautionary guidelines for employees.

The threat of continuing releases to groundwater and soils from the facility is high due to remaining impacted soils in the former drum storage area and shallow depth to groundwater. The uppermost aquifer unit consists of permeable sand and gravels and begins at 30 feet below grade. Two residential wells are located within 3 miles of the facility. The nearest well is over 1 mile west of the facility. Both wells draw from the sand and gravel aquifer at depths of 40 and 85 feet below grade, respectively. There is low potential for residents to come into contact with contaminants in the groundwater from the facility due to the following factors: 1) they are over 1 mile from the facility, and 2) they are located upgradient from the facility.

The threat for a release to air is low due to the fact that contaminants are contained either within buildings or in subsurface soils, and contaminated soils from the hazardous waste piles are covered.

The nearest surface water body is Pleasant Run Creek, approximately ½ mile south of the facility. Potential for a release to surface water via overland flow is low due to the fact that most hazardous constituents are contained within the buildings and in subsurface soils. Stockpiled soils currently at the facility are covered. The potential for a release to surface water via groundwater recharge is also low due to the distance to the nearest surface water body.

To conclude, Metcalf and Eddy has determined that current operations and overall conditions at this facility pose a moderate threat to its workers and a high threat to soils and groundwater.

RELEASED
DATE 9/1/99
RIN #
INITIALS

1.0 INTRODUCTION

Metcalf & Eddy (M&E) received Work Assignment No. R05068 from the U.S. Environmental Protection Agency (U.S. EPA), under Contract No. 68-W9-0007 (TES X), to conduct preliminary assessments and visual site inspections (PA/VSIs) at various RCRA facilities in Region V as part of the Environmental Priorities Initiative.

The Initiative combines CERCLA and RCRA programs in order to select and address RCRA facilities that are a high priority for corrective action using available CERCLA and RCRA authorities. The first step in prioritizing facilities is to conduct PA/VSIs. The PA consists of a preliminary review of existing state and federal file information in order to identify past and potential releases to the environment from solid waste management units (SWMUs) and/or areas of concern (AOCs). Information gathered during the PA include:

1. A list of SWMUs and AOCs at the facility.
2. Unit and waste characteristics of SWMUs and AOCs.
3. Site migration pathways.
4. Documented release history from SWMUs and AOCs.
5. Exposure potential to humans and the environment.
6. Data gaps.

The VSI entails an inspection of the entire facility, including interviews with state (or municipal) and facility representatives and photographs of all SWMUs and AOCs. Major factors considered in the VSI include:

1. The physical condition of SWMUs and AOCs.
2. The identification of SWMUs and AOCs not revealed in the PA.
3. Waste management practices.
4. Identification of release pathways and potential of release to each media.
5. Visual evidence of releases.

The VSI is also intended to uncover releases not identified in the PA, confirm the operational history of the facility, address existing data gaps and provide more information of release pathways and the environmental setting. If evidence of a release is observed at a facility, potential sampling points will be determined.

This report illustrates the results of the PA/VSI conducted at the Contacts Metals Welding, Inc. facility in Indianapolis, Indiana (IND 089263412).

Background file information was gathered from the Indiana Department of Environmental Management (IDEM) and the U.S. EPA Region V files in order to conduct the PA. A walk-through inspection of the facility with facility representatives occurred on November 12, 1992. Eighteen (18) SWMUs and five (5) AOCs were identified during the VSI. A VSI summary and field notes are provided in Appendices A and B respectively.

2.0 FACILITY DESCRIPTION

This section describes the facility location, past and present operations and ownership, waste streams, waste management practices, documented release history, regulatory history, environmental setting, and potential receptors.

2.1 FACILITY LOCATION

The Contacts Metals Welding, Inc. (CMW) facility is located at 70 South Gray St. in central Indianapolis, Indiana. (Zipcode: 46206) Indianapolis is situated in the northeastern portion of Marion County in central Indiana. The facility is located on Gray Street, just south of State Highway 40 and adjacent to the Baltimore and Ohio Railroad. The facility has a longitude of 86 06'42"W and a latitude of 39 46'05"N. (See Figure 1: Facility Location Map.)

The CMW property encompasses approximately five acres. The facility is bordered by a metal shop to the east, a residential neighborhood to the north and northeast, an equipment auctioneer to the northwest and railroad tracks to the south.

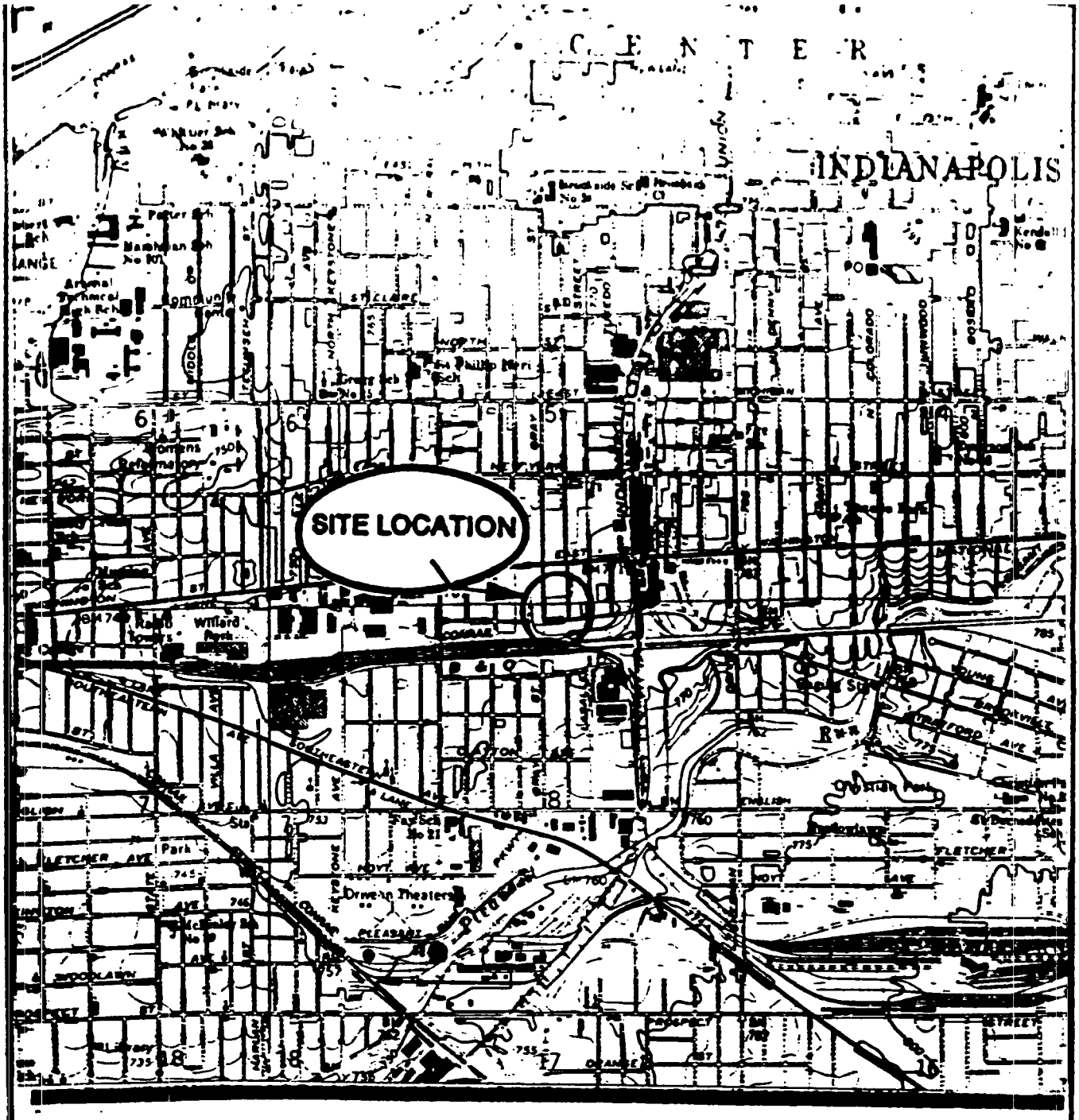
The facility consists of four buildings, two of which (Building 1 and 2) form an elongated "L" and connect at the intersection of Moore and Gray streets. The other two (Buildings 3 and 4) are directly west of Building 2. (See Figure 2: Facility Layout.) Building 1 contains a majority of the metal manufacturing machinery, including powder mixers, presses, furnaces, sinterers, grinders and lathes. Building 1 also contains a degreasing area, pickling and rinse tanks, an etch bath, a graphite bath (fluidized bed), a metal scrap salvage area, a shipping and receiving area, a nurse station and a cafeteria and lounge. CMW offices are located on the second floor and a guard house and dock area is situated at the entrance at the intersection of Gray and Moore streets. (See Figure 3: Building 1 Layout.)

Building 2 contains additional heavy machinery (cold/hot rolls for larger coils), a test area for facility engineers and document storage. Building 3 consists of a plating lab, plating shop, plating solution waste storage area, a product and waste drum storage area, a small office area, a graphite production room, and two boilers (one master, one backup). Building 4 includes a product and waste drum storage area and a tools and records storage area.

2.2 FACILITY OWNERSHIP/OPERATIONS

The facility was owned and operated by P.R. Mallory from the 1920's (exact date unknown) until 1978. P.R. Mallory's Metallurgical Division occupied the facility which consisted of corporate and divisional sales offices and the manufacturing plant. P.R. Mallory operations included sintering, cladding, plating and alloying of powders. In March of 1978, Contacts Metals Welding, Inc. (CMW) acquired the assets of P.R. Mallory's Metallurgical Group which included Buildings 1-4 and all associated equipment. CMW began similar operations pursuant to a lease of property with the option to buy. In 1983 CMW, Inc. purchased the property and has owned and operated the facility to the present time. Current employment is 196 employees.

CMW specializes in non-ferrous powder metallurgy but also manufactures some products from alloy and coil stock. The following metals are used in the development of CMW products: copper, tin, nickel, iron, silver, gold, rhodium, palladium, platinum, cadmium, zinc, zirconium, chromium,



INDIANAPOLIS EAST, IND.
N3945—W8600/7.5

1967
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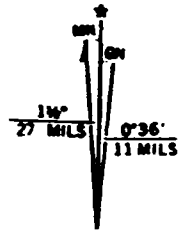
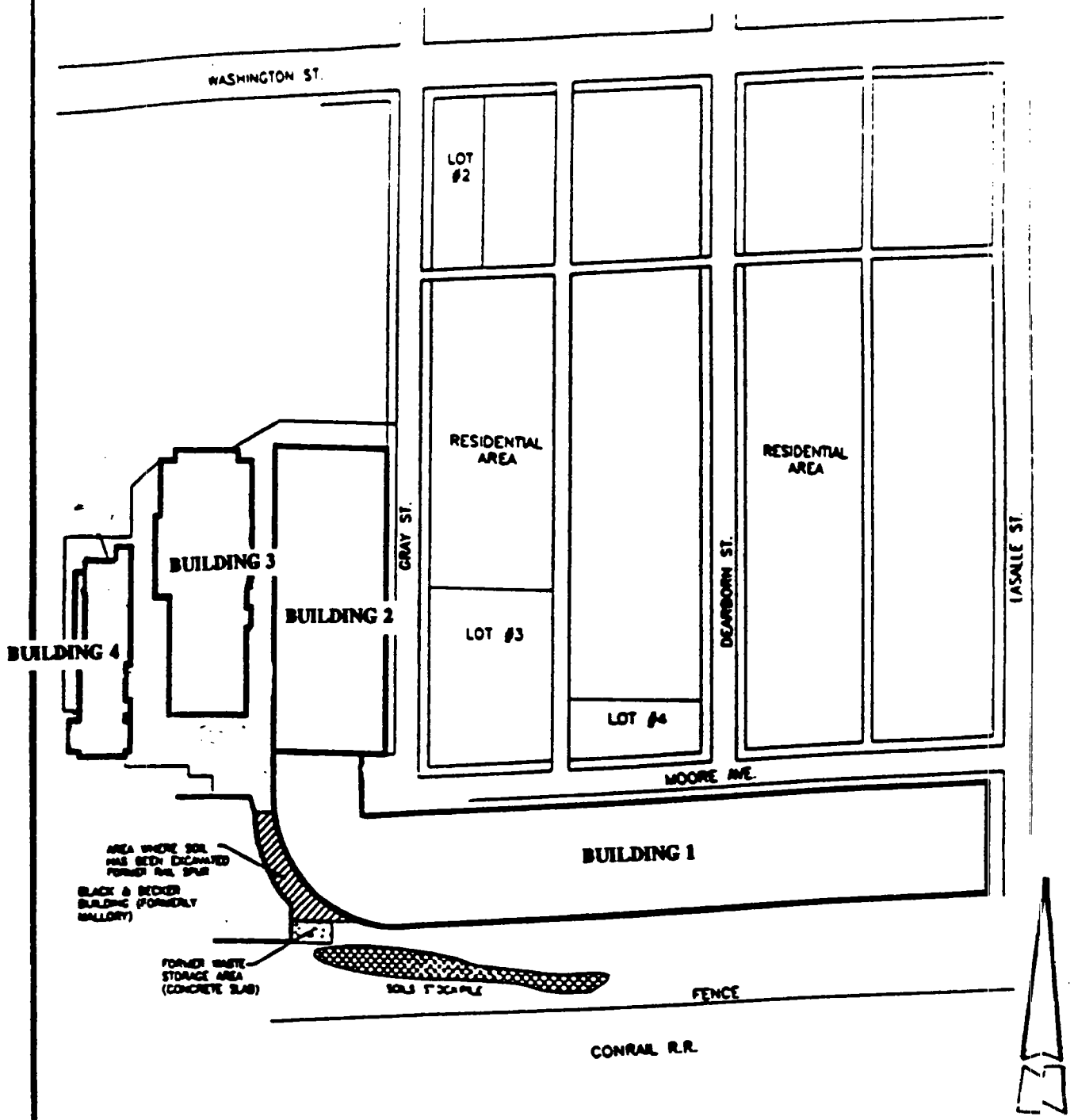
DMA 3763 I SE—SERIES V851

QUADRANGLE LOCATION



Metcalf & Eddy	**SITE LOCATION** **CONTACTS METALS WELDING, INC.** **INDIANAPOLIS, INDIANA.**	Project Number 152068-1-626 Figure 1



M&E Metcalf & Eddy	**FACILITY LAYOUT** **CONTACTS METALS WELDING, INC.**	Project Number 152068-1-626 Figure **2**

SOURCE: ATEC, 1991.

molybdenum, tungsten, beryllium, magnesium, silicon, cobalt, steel and brass. CMW products include electrical contacts, switches and other electrical devices used in various industries such as aerospace and government weaponry. The powder process involves mixing, pressing, and sintering[1], followed by any combination of the following processes depending on the desired result: shipping, alloying, cutting, brazing[2], cleaning, grinding, machining, plating, pressing and heat treating. CMW products made from coil stock (ie. rivets) involve the following processes: cold form, machine, grind, and stamp. Silver products that are manufactured from raw ore are cast and extruded into wire or flat form. Silver wire is then drawn, sometimes heat treated, and shipped. Flat silver is sent to be shaped to a desired form using various machinery (ie. turkshead, cold/hot roll, etc..) and is sometimes heat treated before shipped. Welding caps which are made from bar stock (10-12") are cut, ground, extruded[3], machined and stamped.

There are a variety of waste streams generated from the above manufacturing processes at CMW. (See Table 1: Contacts Metals Welding, Inc. Hazardous Wastes By Generating Process and Waste Code) All hazardous wastes generated accumulate in drums or tanks at their source. Once full, they are transferred to the drum storage area, are waste analyzed and shipped off-site for appropriate disposal. CMW is regulated under RCRA as a generator and therefore all wastes are to be stored for 90 days or less.

Silver sludge and water used to rinse silver casts and shot is generated in the silver cast unit (SWMU #1) (See Table 2: Solid Waste Management Units). The silver cast unit consists of 3 induction furnaces. Silver sludge and water collects in three settling tanks which are immediately west of the furnaces. Cadmium and silver wastewater is captured in a Rotoclone (water scrubber) which is located above the silver cast unit along the east wall of Building 1. (See Figure 4: SWMU and AOC Location Map) Silver casting is conducted from silver alloys which often contain 10% cadmium. The Rotoclone was therefore installed to limit cadmium air emissions. Casting is performed on average two times a week. Both the silver sludge and water and the Rotoclone wastewater are pumped out annually into a drum.

Sodium bisulfate and sodium fluoride (Metex) wastes are generated in the pickling and rinse tanks (SWMU #2), located just north of the silver cast unit on the east end of Building 1. The unit consists of four open tanks ranging from 55 to 101 gallons in capacity. Metals are placed first in a sulfuric acid and water solution, then rinsed in a second tank, placed in a third tank containing Metex and finally rinsed in the fourth tank. This process is necessary to remove oxides from the surface of various metals before they are sent to be finished or plated.

Bright dip, hydrochloric, sodium bisulfate, Oakite Liquidet, Oakite Liqucid, and sodium nitrite (See Appendix D: Material and Safety Data Sheets for CMW Processes) are generated in the tumbling and cleaning area (SWMU #3). This unit is used for etching, cleaning and deburring of metal products and is located in an eastern area in Building 1 along the south wall. The unit consists of 8 plastic lined steel tanks, plastic lined fiberglass tanks and plastic tanks, all vary in shape and capacity from 23 to 90 gallons. Metal parts are lowered into these tanks by hoist to be cleaned. Sewer drainage channels are located just south of this unit (SWMU #17). Contaminated solutions are pumped into 30 and 55-gallon drums 2-6 times a year.

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[1] Sinter: to weld together partially and without melting.

[2] Braze: to solder two pieces of metal together.

[3] Extrude: to shape metal by forcing through a die.

TABLE 1

CONTACTS METALS WELDING, INC. WASTES BY GENERATING PROCESS AND WASTE CODES

Generating Process	Chemical Waste	Waste Code
Silver Casting	Silver (sludge and water)	D011
	Cadmium (solid)	D006
Pickling/Rinsing	Sodium Bisulfate	not listed
	Sodium Fluoride	not listed
Tumbling/Cleaning	Sulfuric Acid	D002
	Nitric Acid	D002
	Hydrochloric Acid	D002
	Sodium Bisulfate	not listed
	Diethylene Glycol Butyl Ether	unknown
	Ethoxylated Cocoamine	D001
	Dodecylbenzene Sulfonic Acid	D002
	Ethanolamine	unknown
	Sodium Acid Pyrophosphate	D002
	Phosphoric Acid	D002
	Nitric Acid	D002
	Sodium Nitrite	D001
Parts Washing	Mineral Spirits	D001, D008
Etching	Sodium Nitrite	D001
Degreasing	1,1,1 - trichloroethane (still bottoms)	F001
Powder Mixing	1,1,1 - trichloroethane	F002
	Acrylic Polymer	D001
	Methyl Ethyl Ketone	D035
	Gold Cyanide	F007
	Potassium Cyanide	F007
	Nickel Cyanide	F007
Plating	Silver Cyanide	F007
	Copper Cyanide	F007
	Sulfuric Acid	F009
	Hydrochloric Acid	F009
	Ammonium Persulfate	F009
	Sodium Phosphate	F009
	Sodium Cyanide	F007
	Nickel Hydrochloric	F009
	Nickel Sulfamate	F009
	Sulfamic Acid	F009

	Trisodium Phosphate	F009
	Nickel Strike	F009
	Nickel Compounds (soluble)	F009
	Tin Stripper	F009
	Butyl Carbitol <5	F009
	Perchloroethylene <5	F009
	Butyl Cellosolve <10	F009
	Lactic Acid <5	F009
	Cadmium Cyanide (no longer used)	F008, F007
Silver cleaning	Ammonium Persulfate	F009
Graphite "Boats"	Asbestos	TSCA waste

TABLE 2
SOLID WASTE MANAGEMENT UNITS (SWMUS)
CONTACTS METALS WELDING, INC.

SWMU Number	SWMU Name	RCRA Hazardous Waste Management Unit*	Status
1	Silver Cast Unit	N	Active
2	Pickling and rinse tanks	N	Active
3	Tumbling and cleaning area	N	Active
4	Parts Washers	N	Active
5	Former degreaser	N	Inactive
6	Etch Bath	N	Active
7	Degreaser	N	Active
8	Powder mix area	N	Active
9	Plating lab	N	Active
10	Plating shop	N	Active
11	Plating solution waste storage area	N	Active
12	Final silver cleaning unit	N	Active
13	Drum Storage are in Building 3	N	<90 - day storage of hazardous wastes, Active
14	Drum Storage area in Building 4	N	<90 - day storage of hazardous wastes, Active

15	Former drum storage area	N	Inactive
16	Contaminated soil waste piles	N	Active
17	Sewer system - Building 1	N	Active
18	Sewer system - Building 3	N	Active

Notes:

* A RCRA hazardous waste management unit is one that currently requires a RCRA permit.

Six small parts washers (SWMU #4) used at CMW generate used mineral spirits. Three of these units are located in central areas of Building 1, one unit is located on the north end of Building 2 and two additional are located in a central location of Building 3. (See Figure 5: Parts Washers Location Map) Approximately 74 gallons of spent mineral spirits are generated monthly and collect in a drum. Heritage Environmental services each washer by picking up the waste and replacing it with fresh mineral spirits. The waste is eventually blended and burned by Heritage Environmental.

A total of approximately 165 gallons of waste 1,1,1-trichloroethane still bottoms are generated annually at a still from two degreasers (SWMU #7 and AOC #3). A second degreaser (SWMU #5) also generated this waste but has been out-of-operation since 1991. This degreaser, though no longer functioning, is situated just east of the tumbling and cleaning area in Building 1.

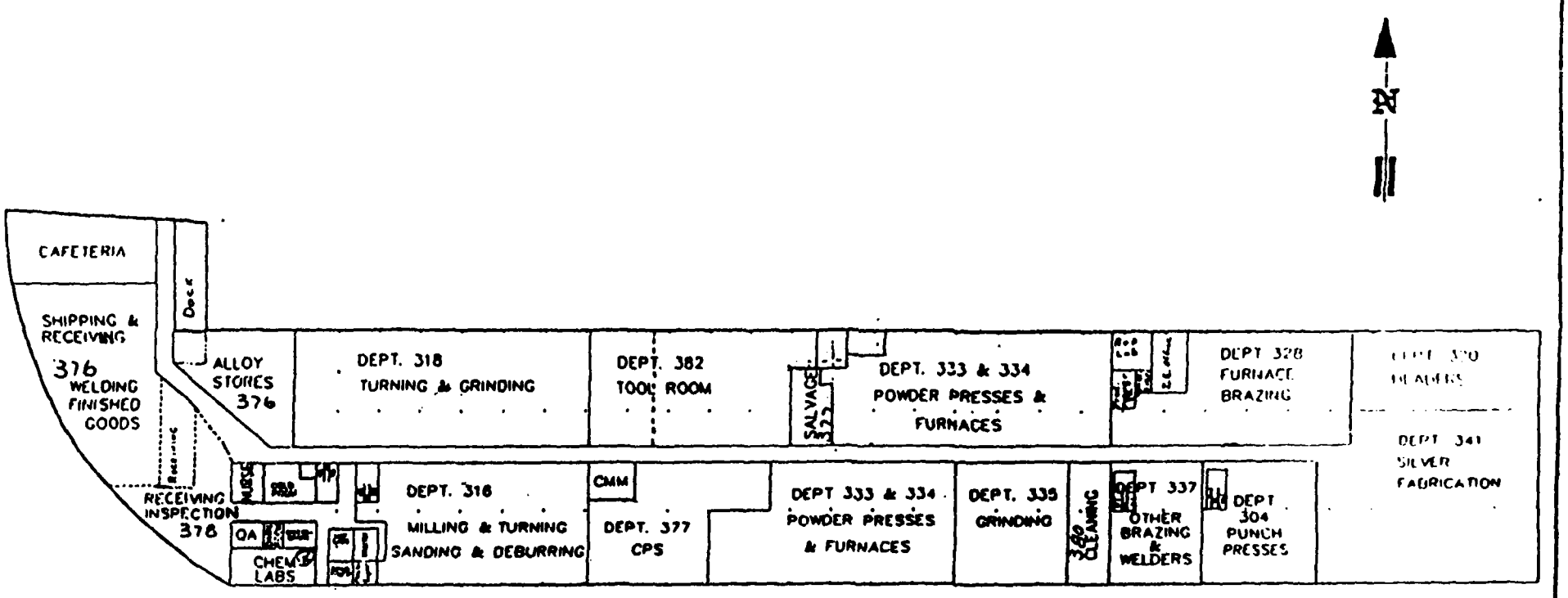
SWMU #7 is a currently operating degreaser located near the south wall in a central area of Building 1 and has an attached still. The unit is approximately 12 feet high, 5 feet wide and 27 feet long and is made of steel. Three different solvent tanks are situated in the unit; the first tank contains heated solvent, the second tank contains cool/clean solvent, and the third tank contains spent solvent. The dirty solvent is pumped to the adjacent still where it is heated. Clean solvent vapors rise and condense on a cold collector and then drain via a trough back to the second tank (clean, cool solvent). As the solvent vaporizes in the still, contaminants and oil remain in the form of still bottoms which are drummed and shipped off annually.

A second operating degreaser (AOC #3) is located in the plating lab in the north end of Building 3. This unit is rectangular in shape and contains two steel tanks which have capacities of 7 gallons of clean 1,1,1-trichloroethane each. The unit is located along the south wall of the plating lab (SWMU #9). Spent 1,1,1-trichloroethane is pumped out of the unit periodically and is sent to the degreaser where it is recycled in the still.

Waste sodium nitrite is generated at the etch bath (SWMU #6), located just north of the tumbling and cleaning area in a central area of Building 1. This unit consists of three open, horizontal steel tanks with approximate capacities of 25, 17, and 25 gallons each. The two 25 gallon tanks contain sodium nitrite etching solution and the 17 gallon tank contains rinse water. The etch bath is designed to remove undesirable metals from the surface of a particular part. Parts are dipped in heated tanks of the etch solution in steel mesh baskets. The waste collects in the bottom of the tanks and is transported to drums twice annually. Approximately 60 gallons of waste sodium nitrite are generated annually and are transported off-site by Envirosolv.

Metallic powder floor sweeps are generated in the powder mix area (SWMU #8). This unit is located between the tumbling and cleaning area (SWMU #3) and the degreaser (SWMU #7) on the south side of Building 1. The unit contains at least four mixers and encompasses an area of approximately 60 X 30 feet. Metal powders are mixed with a vinyl resin binder (made by Stanchem). 1,1,1-trichloroethane is added to dilute the mixture to a form which can flow in the automatic press. The chemical binders are located along the west wall in this area. After mixing, these powders are sifted on trays and are sent to be pressed and sintered. During the sintering process the binder is burned off. Floor sweeps of spilled powders in the mix area are drummed. Approximately 2700 pounds of used powder is generated and disposed of annually. An additional 6900 pounds of used powders are sent out for reclamation annually.

Plating operation wastes at CMW include spent rinsing, stripping, and cleaning solutions such as: silver cyanide, copper cyanide, sulfuric acid, hydrochloric acid, ammonium persulfate, sodium phosphate, sodium cyanide, nickel hydrochloric, nickel sulfamate, sulfamic acid, electroless nickel solution, nickel strike, trisodium phosphate, Technic Tarniban, nickel cyanide, potassium cyanide, and



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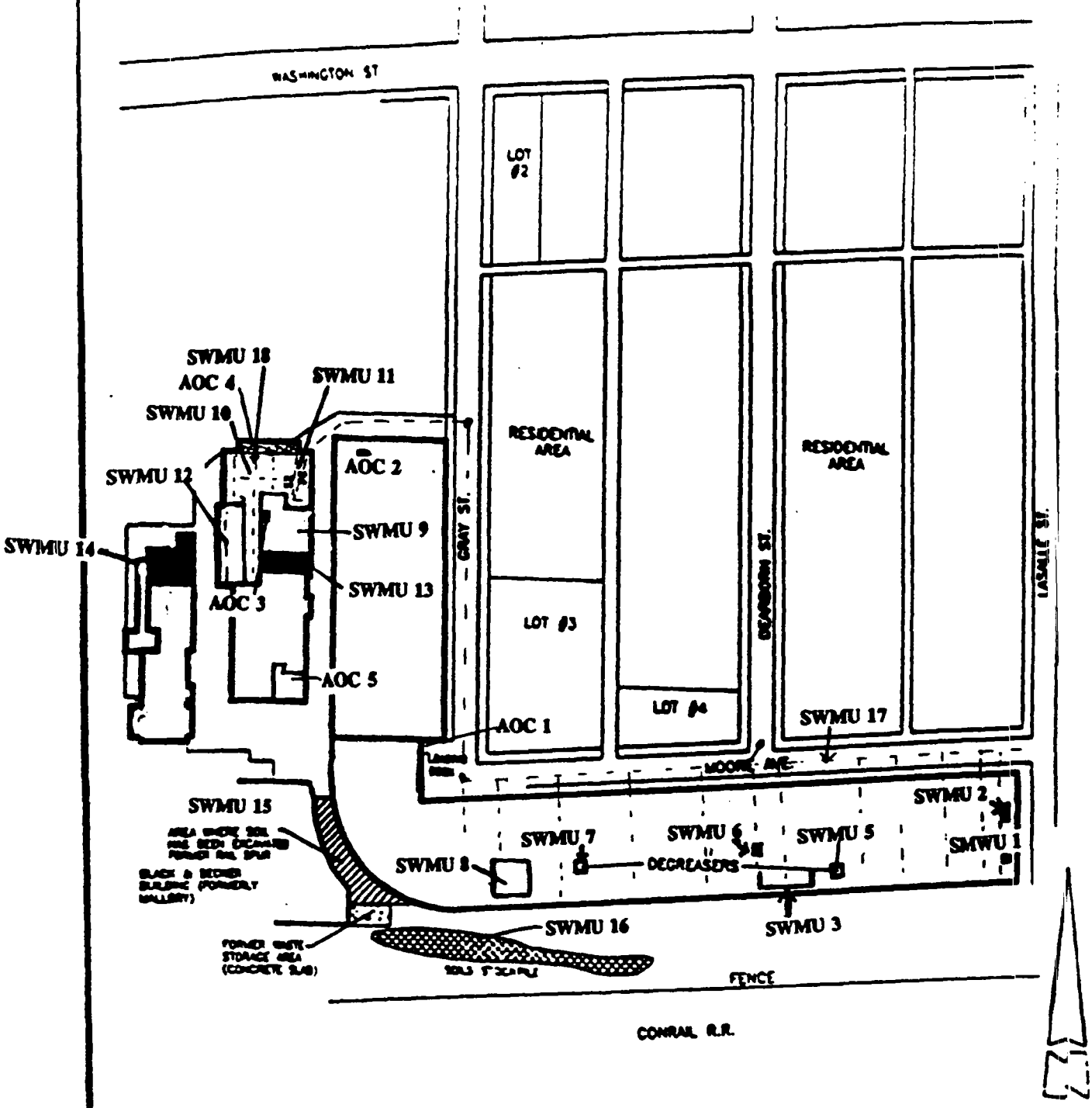
BUILDING 1 LAYOUT
CONTACTS METALS WELDING, INC.
INDIANAPOLIS, INDIANA

Project Number
150068-1-626

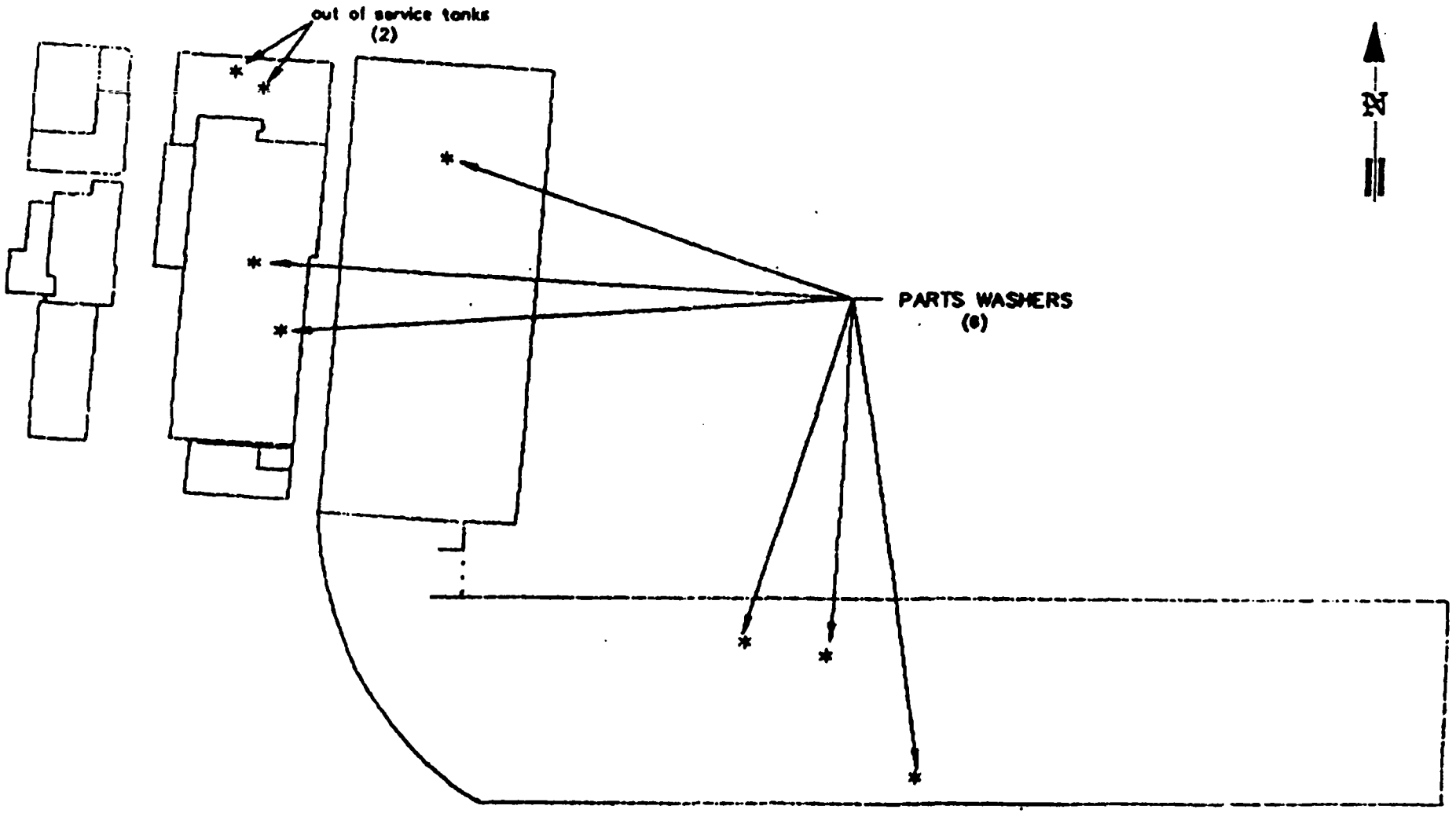
Figure
3



SWMU 17: SEE APPENDIX F
SWMUs 17 AND 18: SKETCH ONLY
SWMU 4 : SEE FIGURE 5

M&E Metcalf & Eddy	SWMU AND AOC LOCATION MAP CONTACTS METALS WELDING, INC.	Project Number 152068-1-626 Figure 4

SOURCE: ATEC, 1991.



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PARTS WASHER LOCATION MAP
CONTACTS METALS WELDING, INC.
INDIANAPOLIS, INDIANA

Project Number
150068-1-626

Figure
5

gold cyanide. Parts are plated with one of the following metals in this area: nickel, gold, silver, cadmium or copper. Plating tank assemblies are set up according to the metal to be plated. The typical procedure is to clean, rinse, plate, rinse and dry. Depending on the metal plated, the whole procedure or parts of it are repeated. Parts are dipped in the tanks via an overhead hoist system. Waste plating solutions are pumped into plastic drums on an as-needed basis and are sent to the drum storage area prior to being shipped off-site for disposal.

Plating operations are conducted in two main areas in the north end of Building 3. One of these areas is a plating lab (SWMU #9) and is approximately 40 X 20 feet in dimension. The area contains 56 steel and plastic tanks which, combined, hold approximately 668 gallons of various plating chemicals. All tanks in this area are elevated on steel trays over a concrete floor. The cyanide tanks are double walled.

The second main plating area, the plating shop (SWMU #10), is close to 1500 square feet in size and contains approximately 63 tanks. Plating tanks vary in size and combined total 6970 gallons of plating solutions. In addition, there are 2 empty tanks (out of service) in a north and central area of the plating shop which are out of service. These tanks contained 1,045 gallons of waste cadmium cyanide solution and 330 gallons of waste sludge. This was drained and disposed of by Cyanochem in 1992. All tanks are underlain by a concrete floor which contains sewer drainage channels. Any drippage from the transfer of parts from tank to tank is channeled to the building sewer system (SWMU #18). Elevated wooden plank walkways separate plating assemblies and are situated over the drainage channels.

Plating solution wastes are stored in a small drum storage area (SWMU #11) in the northeast corner of the plating shop. The following plating wastes are stored in fifteen 16, 50 and 55-gallon plastic drums; silver cyanide(double walled drum), copper cyanide, sulfamic acid, electroless nickel solution, nickel strike, nickel plating solution, technic tarniban concentrate, stripping/cleaning cyanide solution, trisodium phosphate (carboy), and tin stripper.

Waste potassium cyanide is generated at the final silver cleaning unit (SWMU #12), located west of the plating lab and along the west wall of Building 3. This unit covers approximately 20 square feet and consists of a hexagon tumbler (wash tub) which is made of rubber lined steel. Approximately 100 pounds of ammonium persulfate in a plastic carboy and four 55-gallon drums of hydrogen peroxide are located just north of the unit. The wash tub is elevated on a steel tray apparatus and is underlain by a concrete floor. A sewer drainage channel (SWMU #18) runs beneath the unit. Wastes are drained and collected in plastic drums as needed. Approximately 110 gallons of waste potassium cyanide is generated annually.

Graphite dust contaminated with asbestos is generated in the graphite room (AOC #5). Graphite "boats" are manufactured in this area which are used as parts holding fixtures for heat treating, sintering, and brazing operations. Occasionally (less than once a month) these "boats" are made with transite, an asbestos containing material. Transite is used for its thermal properties. All dust from the graphite and graphite/transite processes is collected in a dust collector attached to the manufacturing unit. The dust collector is cleaned out approximately ten times a year. The dust is wet down, placed in 3 milliliter plastic bags, labeled and sent to the Southside Landfill for disposal. A total of 5,590 pounds of graphite dust with asbestos has been generated since 1990.

The following non-hazardous wastes are also generated by CMW: used latex, metal scrap, used cutting oils, a used coolant/lubricant (Trimsol), and wood and paper. The latex is used as a powder mold in the isostatic press. Used cutting oil is generated at various cutting machines. Trimsol is partially reclaimed in a portable filtration unit in the drum storage area (SWMU #13). The remainder is drummed and sent off-site for disposal. Waste metal scrap is sent to a salvage area where it is separated and

categorized by metal for later reclamation. Wood and paper wastes were burned in a former on-site incinerator. The incinerator was located in the southwest corner of the graphite room and measured approximately 52" X 52" X 12'2" high with a stack measuring 32" in diameter and 21'6" high. The incinerator was disconnected in June of 1992. Paper wastes are now recycled at the facility.

All wastes generated at CMW are stored in two drum storage areas in Buildings 3 (SWMU #13) and 4 (SWMU #14) along with product. SWMU #13 is located adjacent and south of the plating lab in Building 3. This area is approximately 60 X 20 feet in dimension and has a storage capacity of 100 55-gallon drums. The following wastes are stored in this area: used cutting oil, metal scrap, and used metal powders. Products stored in this area include: product degreasing solvents, clean hydraulic and lubricating oil and Trimsol. All drums are made of either polystyrene or steel and are situated on wooden skids over a concrete floor. The waste scrap is placed in drums on a concrete floor.

The second drum storage area is located in the northern portion of Building 4 and is approximately 70 X 30 feet in dimension. This area has a storage capacity of approximately 65 55-gallon and 15 16-gallon drums of the following wastes: used cutting oil, used Trimsol, used latex(coagulant), graphite dust, silver and cadmium rotoclone water, silver sludge and water, nickel solids, used sodium bisulfate, used hydrochloric, used Metex, used trisodium phosphate, used sodium cyanide, used nickel hydrochloric, used nickel sulfate, and Technic Tarnisolve. Two products are also stored in this area: ammonia and sulfuric acid. Most of the wastes are stored in 55-gallon steel or polystyrene drums on skids over a concrete floor. This area also contains a portable filtration unit which is used to recover Trimsol (a coolant and lubricant).

A former outside drum storage area (SWMU #15) is located in a rail spur, adjacent and south of Building 1. The dimensions of this area are approximately 130 X 20 feet. Waste cutting oil, latex and used 1,1,1-trichloroethane solvent were stored in 55-gallon drums in this area by both P.R. Mallory and CMW. During a RCRA inspection conducted by IDEM in January of 1986, an oily spill was noted in the area. As a result, soil samples were collected in 1987 and 1988 which revealed contamination of volatile organic compounds. All drums were removed from the area in 1987. Approximately 400 cubic yards of contaminated soils were excavated in December of 1990 and stockpiled in two piles on CMW property. Excavation of contaminated soil in this area halted due to the threat of undermining building structures.

The contaminated soil waste piles (SWMU #16) still exist at the facility and are undergoing waste determination. They are located adjacent and east of the former drum storage area and are covered with plastic sheets.

Other areas of concern at the facility include the loading dock (AOC #1), an indoor drive-in (AOC #4) in the plating shop and an engineer test area (AOC #2). The loading dock is located in the northwest corner of Building 1 and adjacent to Building 2. The area consists of a driveway and loading dock. The loading dock is an inside staging area where all wastes are transported one day prior to pickup. In addition, empty clean solvent drums are sent to this area to be picked up by the vendor for credit. The dimensions of this area are 15 X 15 feet.

The indoor drive-in (AOC #4) is located adjacent and west of the plating shop (SWMU #10) and has an approximate dimension of 20 X 80 feet. Plastic drums (55-gallon) containing caustics (sodium hydroxide, potassium hydroxide, electro chemical 402, Udyprep 268) line the north wall on a concrete pad. A small storage area for 55 gallon drums of product cyanide solutions is fenced and locked in the northwest corner. It appears that this area was used as a garage at one time; however, it is currently used for product storage.

AOC #2 is a test area for facility engineers and is located on the north side of Building 2. The area encompasses close to 3475 square feet and contains a product storage area of metal powders. The storage area contains approximately 10 black steel drums (20-gallons) which are placed both on wooden skids and on a concrete floor. The test area consists of two furnaces.

2.3 DOCUMENTED RELEASE HISTORY

Soil stains covering an area of approximately 900 square feet were noted in the former outdoor drum storage area during an IDEM inspection conducted on January 1, 1986. In a letter from IDEM dated July 8, 1987 to CMW, IDEM requested that EP toxicity tests be conducted on samples taken from the contaminated drum storage area. Results of the sampling and analyses that were subsequently submitted to IDEM from the facility indicated elevated levels of cadmium. As a result, IDEM requested CMW to conduct additional analyses and sampling in the area. Analytical results from additional samples collected in the area in the spring of 1988 indicated cadmium at acceptable concentrations but showed the following detections: acetone(200 ug/kg), 1,1-dichloroethene(180 ug/kg), 1,1 dichloroethane(260 ug/kg), trans-1,2-dichloroethene (4900 ug/kg), chloroform(630 ug/kg), 1,1,1-trichloroethane(5,000 ug/kg), trichloroethene (48000 ug/kg), and tetrachloroethene(2200 ug/kg).

During the VSI, a site representative stated that a former P.R. Mallory employee was authorized to dump drums containing degreasing solvents in the former drum storage area when drums were in demand. The employee described these spent solvents as chlorethene and trichlorethene.

On March 18, 1992, a spill occurred during the transfer of 19 drums containing waste cadmium cyanide onto a truck. The truck driver dropped a drum of waste cadmium cyanide approximately 6" while rolling it off a skid. The impact caused a crack in the edge of the barrel and it began to leak. Approximately 5 gallons of waste cadmium cyanide was released onto the truck, beneath the truck, and on the dock. Oil dry was spread in these areas to contain the spill. Two maintenance employees donned level B protective clothing and pumped the contents of the leaking drum into an empty drum. The spilled material was shoveled up into drums. The area was washed with bleach, dried with Kiln Dust, and then swept. Contaminated clothing and cloths were also drummed for later disposal.

A sewer release was documented in an Agreed Judment and Fine, filed in the Municipal Court of Marion County on July 16, 1990. Wastewater discharges from the facility on November 2 and 6, 1989, and December 5 and 20, 1989, were outside the acceptable pH range as specified in Section 27-4(c)(2) of the Municipal Code of Indianapolis and Marion County, Indiana and Industrial Permit #362301.

Releases were also noted during the VSI conducted on November 12, 1992. Spilled metallic powders from the powder mix area (SWMU #8) were noted on the floor of Building 1 (see Appendix A: Visual Site Inspection Summary and Photograph Log) These powders are swept up and transferred to drums for later reclamation. Spills of sodium nitrite were noted on the floor and on the tanks in the etch area (SWMU #6) in Building 1. Floor stains were noted around tanks in the cleaning and tumbling area which could originate from a variety of cleaning solutions (SWMU #3). Staining was also observed on the pickling and rinse (SWMU #2) tanks and concrete pad in Building 1. White precipitate was noted on a nickel plating bath tank in the plating lab (SWMU #9) in Building 3. Oil-like stains were observed in the drum storage area in Building 4 (SWMU #14) and indoor drive-in in plating shop (AOC #14). Floor stains and tank stains from various plating solutions were observed in the plating shop in Building 3 (SWMU #10). A sewer drainage channel runs under these tanks (SWMU #18) which funnels all drippage to the sewer. Rust colored solids were observed in these channels during the VSI. In addition, cooling fans that were located near facility workers in the powder mix area and the vapor degreaser in Building 1 were blowing in the direction of the workers. A black stain was also noted on the concrete floor near the degreaser during the VSI. A foul odor was reported by a facility employee who was working the degreaser in 1989. Shortly thereafter, the degreaser was moved to another area and the air was tested by an OSHA representative. No contaminants were detected by OSHA during this testing.

2.4 REGULATORY HISTORY

CMW is regulated under RCRA as a generator. Combined state and federal file information on the facility begins with a generator inspection report prepared by IDEM representatives during a facility inspection on January 1, 1986. An oily spill was observed during the inspection in the former drum storage area. The following violations were also noted during the inspection (summarized in a letter dated February 19, 1986): no hazardous waste determinations provided for sodium nitrite, silica sand, and contaminated soils in the drum storage area, inadequate personnel training and records, deficiencies in the facility contingency plan, lack of spill control equipment, drums lacking accumulation date or hazardous waste label, and wastes stored over the 90 day limit. IDEM requested CMW to submit a plan of action to achieve compliance with the above violations.

A RCRA Notice of Inadequacy dated July 16, 1986 was sent to CMW in response to the plan of action CMW provided to achieve compliance. IDEM requested EP toxicity tests for silica sand and soil samples from the former outdoor drum storage area. In addition, IDEM noted defiencies in CMW's hazardous waste management personnel training records, and emergency preparedness.

The facility was reinspected by IDEM on October 16, 1987 where it was determined that CMW had achieved compliance with the terms of the Notice of Violation dated February 6, 1986; however, concern was expressed regarding the release observed in the former drum storage area. A Notice of Compliance was sent to the facility on November 4, 1987. A Violation Letter dated November 19, 1987 was also sent which addressed the concern of contamination in the former drum storage area. Laboratory analysis of soil samples collected by ATEC in this area indicated cadmium contamination (7.8 mg/l). As a result, IDEM requested CMW to prepare a site assessment plan in order to assess the degree and extent of contamination in the soil and any impacts on groundwater.

CMW contacted ATEC Environmental Consultants to prepare the site assessment plan. On January 27, 1988 ATEC submitted the site assessment plan to IDEM. The plan was approved by IDEM on March 1, 1988. A Sampling and Analysis Report was submitted to IDEM on June 10, 1988. Samples were collected from four soil borings in the former drum storage area and were analyzed using the TCLP method for volatile organic compounds and cadmium. Cadmium levels ranged from .4 to .8 ppm at one borehole and was determined by ATEC to be at acceptable levels. Numerous volatile organic compounds were found above the TCLP allowable levels such as trichloroethlene (48 ppm) and trans-1,2-dichloroethylene (1.3 ppm). (These results were based on total concentrations rather than TCLP concentrations.) As a result, ATEC recommended remediation and proper disposal of the contaminated soils.

IDEM responded to the Sampling and Analysis Report on July 25, 1988 with a request for more extensive sampling to be conducted in the impacted area to determine; 1) the vertical extent of contamination, 2) the methods of remediation and 3) the methods of disposal. A Sampling Analysis and Cleanup Plan was prepared by ATEC on August 25, 1988 to determine the areal and vertical extent of soil contamination by trichloroethylene and trans-1,2-dichloroethylene in the former drum storage area.

A Letter of Compliance was sent by IDEM to CMW on September 30, 1988 for violations listed in the November 19, 1987 Notice of Violation. This letter also indicated that a review was being conducted of the Sampling, Analysis and Cleanup Plan (SACP). In a Notice of Deficiency dated October 26, 1988, IDEM indicated various inadequacies in the SACP. IDEM requested CMW to include soil analysis for cyanide and other hazardous constituents found at the site. In addition, better presentation of analytical data was suggested to show the location and depth of each sample. The use of a HNU-PID was not accepted as an accurate means for determining cleanup levels. The cleanup plan's confirmatory analyses was to include all the hazardous constituents indicated in previous analyses and not solely trans-

1,2-dichloroethylene and trichlorethylene. CMW was also requested to standardize units of measure for samples, provide soil boring information including soil types, install additional soil borings and revise the cleanup level for cadmium from 100 mg/l to .01 mg/l (clean water standard). Additionally, the areal extent and depth of contamination was to be defined prior to excavation, contamination was to be determined by using detection limits and not TCLP procedures, background readings were to consist of a minimum of four boreholes, and the removed soil was to be placed in containers compatible with the waste (not plastic sheets).

ATEC prepared and submitted a revised SACP on December 9, 1988 which incorporated IDEM's comments and requests. A Notice of Acceptance was issued by IDEM on February 2, 1989 regarding the revised SACP. Cleanup activities began with drum removal in June of 1989. Soil excavation and the removal of an underground gas tank in the former drum storage area was conducted in December of 1990. According to CMW, soil excavation was conducted with the intent to delineate the vertical and lateral extent of contamination. However, CMW discontinued excavation when it determined that solvent concentrations in the soil were increasing with depth and further excavation would undermine the foundations of adjoining buildings. Approximately 400 cubic yards of contaminated soils were stockpiled on CMW property before the excavation was halted. The excavated area was covered with clean fill and gravel. An IDEM letter dated December 27, 1990, indicated concern that the stockpiled soil created a waste pile. As a result, IDEM requested CMW to remove and properly dispose of the contaminated soil within 60 days.

CMW sent a Special Waste Application Form and analytical data to IDEM on March 7, 1991 in a request for an extension of time for cleanup activities. CMW collected soil samples from the waste pile to determine appropriate disposal. The analyses indicated that the waste pile soils did not possess any hazardous waste characteristics. As a result of this analyses, CMW stated the following; "CMW believes that the stockpiled waste can be properly classified as special waste because it does not possess a hazardous waste characteristic, because CMW has no firsthand knowledge as to the process that created the waste, and because all relevant activities occurred before 1980". CMW also indicated in the letter that contamination in the area is attributable to P.R. Mallory's operation of the site. According to CMW, a former P.R. Mallory employee currently working for CMW recalls dumping solvents (in the area from which the stockpiled soils were created) when drums were scarce. CMW asserted that if IDEM wanted to use this information to attribute the contaminated soils to a particular hazardous waste source and therefore characterize the soil as a listed hazardous waste, they should seek P.R. Mallory as the responsible party for soil disposal.

On March 15, 1991 IDEM granted CMW a 30 day extension for soil disposal to allow the Special Projects Section of IDEM time to review analytical results of the soil and review the Special Waste Application for disposal of the soil. The PRP Section of IDEM requested additional information regarding the sources of TCE and the name of the former P.R. Mallory employee in a letter dated March 19, 1991.

On March 27, 1991 CMW requested an additional 30 day extension to respond to the PRP Section's letter. Time extensions were approved for both soil disposal and information request responses in a letter from IDEM dated April 8, 1991. CMW's response to the information requested by the PRP Section was submitted to IDEM on April 15, 1991. Volatile organic analyses of two samples collected from the stockpiled soil (using the TCLP method) did not indicate TCE above the detection limit. As a result, CMW maintained that the stockpiled soil should be disposed of as a special waste.

In addition, CMW provided IDEM with the possible sources of TCE. According to CMW, they have never used in their operations any product with a significant level of TCE. The solvent CMW uses in their degreasing operations is 1,1,1-trichloroethane, which contains less than 5% of TCE. As a result,

CMW attributed possible TCE contamination in the former drum storage area to the former owner, P.R. Mallory. CMW's response letter concluded with the acknowledgement of IDEM's approval and permit (not in file) to dispose of the stockpiled soil as a special waste.

IDEM rescinded their Special Waste Approval of the soil on April 25, 1991. On April 26, 1991, IDEM granted CMW an indefinite extension of time for disposal of the stockpiled soil "contingent upon a final classification of the soil as a hazardous waste or a special waste". According to CMW's response to the PA/VSI facility letter dated October 16, 1992, IDEM's current position is that the soil should be managed as a hazardous waste. IDEM maintains that listed hazardous wastes are "contained in" the stockpiled soil and therefore the soil must be handled as hazardous waste. In August of 1991, IDEM ordered CMW to either dispose of the stockpiled soil as hazardous waste or provide documentation that the soil does not contain any detectable levels of listed hazardous wastes. Currently, CMW and IDEM are negotiating the characterization of the stockpiled soil and the appropriate subsurface cleanup for the remaining contaminated soil.

Other Environmental Reports/Permits:

CMW prepared a Form R-Toxic Chemial Release Inventory Reporting Form on June 26, 1992 per 40 CFR 370 (Community Right to Know). This form is required for all facilities that have 10,000 pounds or greater of hazardous chemicals or 500 pounds or greater of extremely hazardous substances present at the facility. CMW reported a release quantity of 50 pounds and an off-site recycling quantity of 160,000 pounds of copper compounds in 1992. In addition, a release quantity of 10,000 pounds of 1,1,1-trichloroethane was also reported on the Form R. A Tier Two form (Emergency and Hazardous Chemical Inventory) was also completed and submitted in June of 1992. Reporting is mandatory for all hazardous chemicals that require a MSDS (with some exemptions). CMW reported the following hazardous substances on their Tier Two: tungsten and tungsten carbide powders, cadmium oxide, potassium cyanide, sodium cyanide, nitrogen, and hydrogen.

The City of Indianapolis Air Pollution Control Division granted CMW an air emissions permit to operate four belt sanders (and one buffer) and two boilers at the facility. This permit expires on June 29, 1993. Permits for other emissions at the plant are not necessary according to the facility.

IDEM's Department of Solid and Waste Management approved CMW's request for disposal of their K-300 Latex compound (natural rubber) as a solid waste.

The City of Indianapolis, Department of Public Works authorized CMW to discharge industrial wastewater to the municipal sewer system in an Industrial Discharge Permit (#362301) at an unknown date prior to July of 1990. An Agreed Judgement and Fine was filed on July 16, 1990 which stated that CMW had released high pH wastewater (in violation of their Industrial Discharge Permit) to the municipal sewer system on four days in 1989. According to the Agreed Judgement CMW would provide any information deemed necesssary by the Director of the Department of Public Works to issue a modified industrial discharge permit promulgated in 40 CFR 471 (Nonferrous Metals Forming Point Source Category). In addition, CMW agreed to install flow measuring equipment or provide alternate flow measurement methods to verify discharge volumes at permitted outfalls. Finally, CMW was charged a total fine of $1053.00 for the wastewater discharge violations.

On August 9, 1991, a certified letter was sent to CMW from the City of Indianapolis which required CMW to comply with the Agreed Judgement by October 31, 1991 and to submit a plan of action by September 15, 1991. On November 11, 1991, the City decided to write a modified wastewater discharge permit for CMW using their best current information and estimations due to CMW's failure to comply with the requirements set forth in the Agreed Judgement.

The facility is regulated under 40 CFR 471, Subparts D and E; Nonferrous Metals Forming, Precious Metals and Refractory Metals, Existing Source and 40 CFR 468 Subpart A; Copper Forming, Existing Source. The wastewater permit was modified by the City of Indianapolis to include federal categorical limitations. Federal parameters measured for various industrial processes at CMW are summarized as follows:

Industrial Process	Parameters Measured
Nonferrous Metals Forming-Precious Metals	copper, cadmium, total cyanide, silver.
Nonferrous Metals Forming-Refractory Metals	copper, nickel, fluoride, molybdenum.
Copper Forming	copper, nickel, total chromium, lead, zinc, oil and grease.

The modified permit was sent to CMW on January 21, 1992. This permit included discharge limitations for all three of CMW's outfalls. (See Appendix E-CMW Wastewater Permit and Self Monitoring Results) Due to CMW's failure to provide adequate wastewater flow data generated from specific regulated processes and to which outfalls the regulated flows are discharged, the City assumed all flows reported by CMW to be regulated wastewater.

On March 27, 1992, CMW submitted monthly flow data to the City of Indianapolis, Department of Public Works. Included with this data was a letter which stated that the monitoring limits were improperly applied to the facility. CMW asserted that all process water from copper forming applies to their outfall #3 and that outfall #1 should be monitored for plating operations only. In addition, CMW alleged that their permit limits were lower than the quality of incoming city water in many instances. Wastewater self monitoring reports for the month of October 1992 indicate discharge exceedences (according to the modified permit standards) for the following parameters at all three outfalls: cadmium, copper, lead, nickel, and silver. (See Appendix E.)

According to CMW's response to the PA/VSI facility letter(dated Oct.16, 1992), they are no longer regulated by the City of Indianapolis, Department of Public Works as a plating facility. Wastewater discharge standards are stricter for non-plating facilities, and as such, CMW is not in compliance. CMW maintains that they were "involuntarily reclassified out of the metal finishing category". CMW is currently working on designing their own wastewater treatment plant, but does not anticipate selecting equipment until the classification issue is resolved.

2.5 ENVIRONMENTAL SETTING

The following sections describe the local climate, soils, surface waters, geology and hydrogeology in the area of the site.

2.5.1 Climate

Marion county falls within the Humid continental climate region which is characterized by hot summers and cold winters. The normal annual temperature range is 40-60 degrees (F) with temperatures fluctuating between 30-50 degrees in January and 70-90 degrees in July. The facility is also located in the general physiographic region called the Drift Plain and is locally characterized by gently undulating uplands. The predominant wind pattern in January is from west to east while in July it is from southwest to northeast. (Goodes,1984)

The average annual precipitation is 40 inches, with an average of 10-20 inches falling from November to April and 20-40 inches falling between May and October. The 1 year, 24-hour rainfall value is 2.5 inches and the mean annual lake evaporation value is 33 inches. (USDC, 1963.) Natural vegetation in Marion County consists of broadleaf deciduous trees which are predominantly Beech and Maple. (Goodes, 1984)

2.5.2 Area Soils and Surface Waters

The main soil type in the area of the facility is the Urban land-Miami complex(UmB), with 0 to 6 percent slopes. This unit consists of approximately 50% of Urban land, 30% of well drained Miami soils and small percentages of poorly drained Crosby and Brookston soils and Cut and Fill land. Urban land is unidentifiable due to building activities which have extensively altered the natural soil. The Miami series consists of deep, nearly level to moderately steep, well drained soils. These soils formed in loess and the underlying calcareous glacial till. In a representative profile, the surface layer is brown silt loam (0-8 inches) followed by a firm dark brown clay loam (0-24 inches). The underlying material is brown loam which extends to a depth of approximately 60 inches. (USDA, 1978)

This nearly level and gently sloping unit is on gently undulating till plains. Alteration is evident in areas where short, complex slopes have been cut and the soil has been used as fill for leveling or for smoothing out lower lying areas. Runoff is generally rapid on the Miami soils. Permeability is moderate in the Miami soil. Available water capacity is high. Organic-matter content of the surface layer is moderate. Most of the area in this unit is drained by sewer systems and gutters, with some usage of drainage ditches. The Miami soils have slight or moderate limitations for most nonfarm uses. They are well suited to lawns, vegetable and flower gardens and shrubs and trees and not assigned to a capability unit or woodland suitability subclass. (USDA, 1978)

Surface water bodies in the near vicinity of the facility include Pleasant Run Creek, Pogues Run Creek and the White River. Pleasant Run Creek, a tributary of the White River, is the nearest surface water body, located 1/2 mile southeast of the facility. Pogues Run Creek is located approximately 1.5 miles north of the facility and the White River is almost four miles west of the facility. All surface water bodies are used recreationally; the White River is also used as the principal drinking water source. The White River flows north to south. The distance to the nearest drinking water intake is over 4 miles west of the facility on the White River. Water from an intake in the White River is supplied to the 20th Street treatment plant in Indianapolis through a feeder canal that originates on the upstream side of a low dam at Broad Ripple. (Harrison, 1963). The distance to this intake is approximately 1.5 miles north of the city center on the White River. This intake serves the greater metropolitan area, including the CMW facility. Other intakes are located on Fall Creek and Eagle Creek which serve the northeast and southeast

population of Indianapolis respectively. (Giltner, 1992) These intakes are also over 4 miles from the facility.

CMW sewer water flows through the Belmont Water Treatment Plant where it is treated prior to being discharged into the White River. Due to the flat topography of the area, facility runoff during heavy rains could go in multiple directions. The former facility is located outside the 100 year flood boundary; however, local ponding was observed after heavy rains during the VSI.

2.5.3 Area Geology and Hydrogeology

Indianapolis is located in the physiographic province of the Central Lowlands and is situated on the Tipton Till Plain. Topographically, the facility is located on the hummocky disintegration moraine of intermediate relief (10 to 25 feet) or hummocky end moraine (Harrison, 1963). The Tipton Till Plain consists of three drift sheets which were deposited during three glacial ages. Dating from earliest to most recent they are: Kansan, Illinoian, and Wisconsinan.

The glacial till comprises the uppermost stratigraphic unit at the facility and is characterized as a loam till which consists of sand and silt with some clay. The average thickness of the fill is 140 feet in Marion County and 110 feet within a 1 mile radius of the facility (Harrison, 1963). The sedimentary rocks that form the old eroded bedrock surface beneath Marion County represent three geologic systems: Silurian, Devonian, and Mississipian. These rocks form nearly planar layers that slope gently to the west. Therefore, increasingly older material appears at the bedrock surface in an easterly direction (Hartke, et.al., 1980).

The youngest system is the Mississipian which contains shale and sandstone and is completely eroded in the vicinity of the facility. The Devonian system underlies the Mississipian and contains New Albany Shale, North Vernon Limestone, Jefferson Limestone and Geneva Dolomite. The Silurian system is the oldest system which underlies the Devonian rock and consists of Mississinewa Shale, Louisville Limestone, Limberlost Dolomite and Salamonie Dolomite. New Albany Shale was located at a depth of 90 feet below the land surface at a well approximately 1/2 mile south of the facility. The shale was underlain by the North Vernon and Jefferson Limestone which was located at 105 feet below the land surface, extending to 237 feet. An on-site well indicates bedrock (New Albany Shale) at 112 feet below the land surface.

Glacial till which comprises the uppermost stratigraphic unit at the facility is also the uppermost water bearing unit. The depth to this aquifer is approximately 30 feet which is also the depth to the water table. The general groundwater flow direction in the area of the facility is to the south and southeast, towards Pleasant Run Creek. The principles sources of ground water in Marion County are 1) the beds of sand and gravel in the unconsolidated deposits overlying bedrock, 2) the Jefferson Limestone and Geneva Dolomite and 3) the Niagara Limestones. A high capacity well is located at CMW which was used for furnace operations until April of 1992. This well drew from New Albany Shale at a depth of approximately 112 feet below the land surface and had a total withdrawal capacity of 450 gallons per minute. Currently CMW obtains water from the Indianapolis Water Company to run their industrial operations. Numerous other industrial wells are located within a 1/4 mile radius of the facility. (See Appendix F: Industrial and Commercial Well Logs) Most of these wells draw from the Niagara Limestone aquifer from depths of 123 to 237 feet below grade. No information was available regarding perched aquifers.

Nearly 100% of the residential population in Indianapolis obtains its drinking water from surface water resources provided by the local water company; however, there are some private wells. The nearest residential well is approximately 1 mile west of the facility at 1615 East Avenue (Indianapolis

West Quadrangle, Section 7, T.15N, R.4E.). According to Mike Smith of the IDNR, this well was drilled in August of 1991 to a depth of 112 feet. Drinking water is obtained from the sand and gravel aquifer which begins at 85 feet below grade. Current use of this well is unknown. Another residential well is located approximately 2 1/4 miles northeast of the facility (Indianapolis East Quadrangle, Section 33, T.16N, R.4E). According to the IDNR, this well was drilled in June of 1992 and extends to 105 feet below grade. Drinking water at this well is also obtained from the sand and gravel aquifer, beginning at 40 feet below grade. (IDNR, 1992)

2.6 RECEPTORS

The CMW facility is located in a mixed residential, commercial and industrial area of Indianapolis. Residential properties border the facility to the north and northeast, a metal shop is located directly to the east, and commercial and industrial businesses are situated north and west of the facility. The distance to the nearest residence is approximately 100 feet north of the east end of Building 1. There are other residences and industries and agricultural lands within a four mile radius of the facility.

CMW has a 24 hour surveillance system which includes a guard post with 8 pan/tilt cameras and metal detecting devices. Access to the facility from the north is restricted by the guard post at the main entrance and a fenced driveway at the northwest entrance by Building 2. A second fence runs behind Building 1 and inhibits access from the south. Access barriers on the facility's west and southwest side are unknown.

According to facility representatives and a review of file documents, no chemical odors have been reported by nearby residents. A facility worker complained of a solvent smell while working at a degreaser in 1989. Shortly thereafter, the degreaser was moved to another location and the air was tested by an OSHA representative. No contaminants were detected by OSHA during the testing.

The nearest surface water body is Pleasant Run Creek, approximately 1/2 mile southeast of the facility. Indianapolis drinking water is obtained from the White River and two of its tributaries, Fall Creek and Eagle Creek, all of which are over 4 miles from the facility. Some residents obtain their drinking water from private wells; the nearest residential well is located approximately 1 mile west of the facility.

The only sensitive environment in the area of the facility is the Loggerhead Strike, a carnivorous bird of the Family Laniidae. The Loggerhead Strike is a federally endangered species and was observed in 1978 in Section 28 of the Beech Grove Quadrangle, approximately 3 miles northeast of the facility. No state or national parks, wetlands, wildlife preserves, or critical habitats are located within a four mile radius of the facility.

3.0 SOLID WASTE MANAGEMENT UNITS

This section describes in detail the SWMUs identified during the PA/VSI. It includes a description of the waste unit, dates of operation, wastes managed, release controls, release history, and observations. (See Appendix A for photographs of SWMUs and AOCs.)

SWMU 1:	**Silver Cast Unit**
Unit Description:	This unit consists of three furnaces measuring approximately 4' X 5' X 8' tall each, three adjacent settling pits, and a ventilation cleaning system (Rotoclone). The unit is made of steel and is located along the far east wall of building #1. The Rotoclone is a water scrubber which recovers metals and is located above the cast unit.
Date of Start-up:	P.R. Mallory began operation of this unit in 1967 including the rotoclone.
Date of Closure:	This unit is currently operating.
Waste Managed:	Silver sludge and water used to rinse silver casts and shot in this unit is collected in the settling pits, located immediately west of the furnaces. This is pumped out annually into 55 gallon steel drums and totals approximately 165 gallons. These drums are analyzed for silver content (D011), labelled and manifested off-site for appropriate reclamation or disposal. If silver content is greater than 5%, it is sent to a refractory to be reclaimed; if it is less than 5%, it is disposed as hazardous waste. Cadmium sludge and water (D006) is extracted from the air in the Rotoclone unit located above the cast unit. The Rotoclone operates twice a week. Approximately 275 gallons of Rotoclone wastes are pumped into 55 gallon steel drums once annually. These drums are sent to the drum storage area where they are tested, characterized, labelled and manifested off-site to an appropriate disposal facility.
Release Controls:	The Rotoclone is a water scrubber. Shaped like a hood, the Rotoclone is a capture unit, taking up air from the silver casting unit and collecting cadmium in solid form. Three settling pits collect silver and water from the three induction furnaces. Facility workers operating this unit are required to wear coveralls and an APR. There are no other release controls at this unit.
Release History:	No releases have been documented.
Observations:	No signs of contamination were observed. Due to the age of the facility, the floors were cracked and stained throughout.

SWMU 2:	**Pickling and Rinse Tanks.**
Unit Description:	This unit consists of an assembly of 4 small rectangular open steel tanks which are elevated on a concrete pad. In general, metals are placed via a hoist system first in a 55 gallon sulfuric acid tank (80% water), then in a 55 gallon water rinse tank, then in a 101 gallon tank containing Metex solution, and finally rinsed in a 85 gallon water tank. This process is conducted in order to remove undesirable oxides from the surface of metal parts before they are plated or finished. The unit is located along the east wall of the main building, just north of the silver cast unit.
Date of Startup:	1978. (possibly prior to this year under P.R.Mallory's ownership)
Date of Closure:	This unit is currently operating.
Wastes Managed:	Approximately 180 gallons of Metex solution (sodium bisulfate and sodium fluoride are not listed) is generated annually. This solution is pumped into 55 gallon steel drums and manifested off-site for proper disposal. The sulfuric acid (F009) and water mixture is not drained but replenished and therefore is not considered a waste.
Release Controls:	The tanks are constucted of steel and are situated on a concrete pad. A vent is located above the sulfuric acid tank, carrying emissions to the outside. There are no other release controls.
Release History:	No releases have been documented.
Observations:	The tanks were elevated on a concrete pad which was approximately 6" thick. During the VSI, white streaks were noted on the side of tanks and on the concrete pad, probably from the transfer of parts from one tank to the next. The floors were cracked and stained throughout the building.

SWMU 3:	**Tumbling and Cleaning Area.**
Unit Description:	This unit is used for etching, cleaning and deburring of metal products and is located in an eastern area of Building 1 against the south wall. The unit consists of 8 open rectangular plastic-lined steel tanks, plastic-lined fiberglass tanks and plastic tanks, all of which vary in shape and capacity from 23 to 90 gallons. Copper parts are lowered into these tanks by a hoist system to be cleaned. An exhaust system is located over the acid tanks and the sodium bisulfate tank.
Date of Startup:	1978. (possibly prior to this date under P.R. Mallory's ownership)
Date of Closure:	This unit is currently operating.
Wastes Managed:	The following wastes are generated and disposed of annually at this unit: 3-55 gallon drums of Bright Dip (D002), 6-55 gallon drums of hydrochloric and water (D002), 3-55 gallon drums of sodium bisulfate and water (not listed), 6-55 gallon drums of Oaklite Liqui-det (D001, D002), 6-55 gallon drums of Oaklite Liquacid (D002), and 2-30 gallon drums of sodium nitrate (D001).
Release Controls:	Tanks are elevated on steel tables. The tanks are open and are constructed of plastic-lined steel, plastic-lined fiberglass and plastic. An exhaust system is located over acids and the sodium bisulfate tank. There are no other release controls.
Release History:	No releases have been documented.
Observations:	The steel tanks in this area were rusty, and stains were noted on the sides and below the tanks. It appeared that spilling had occurred during the transfer of parts between tanks. A sewer drainage channel runs just south of these tanks. The floors were cracked and stained throughout the building.

SWMU 4	**Parts Washers.**
Unit Description:	Six small parts washers are located in various areas of Buildings 1, 2 and 3 (see Figure 5). These washers are regularly serviced by Heritage Environmental. Parts are cleaned with mineral spirits. Spent mineral spirits are collected and replaced by fresh mineral spirits monthly. The waste is eventually blended and burned by Heritage Environmental.
Date of Start-up:	1978.(possibly prior to this date under P.R. Mallory's ownership)
Date of Closure:	This unit is currently in operation.
Wastes Managed:	Approximately 74 gallons of spent mineral spirits (D001, D008) are generated at these washers monthly.
Release Controls:	The waste is contained in drums at each washer. There are no other release controls.
Release History:	None.
Observations:	These units were not observed during the VSI. Knowledge of their existence was not obtained until after the VSI.

SWMU 5:	**Former Degreaser**
Unit Description:	This unit is located adjacent to east of the tumbling and cleaning area and is no longer in operation. It is approximately 9 feet high, 4 feet wide, and 14 feet long and is made of steel. Parts were sent through the unit to be degreased in steel baskets. During operation, spent 1,1,1-trichloroethane was pumped out of the unit and transferred to the second degreaser (SWMU #7) which has a still attached to it. The still cleans the solvent and collects still bottoms. An exhaust system was hooked up to it which vented emissions outside.
Date of Startup:	1978.(possibly prior to this date under P.R.Mallory's ownership)
Date of Closure:	March 1991.
Wastes Managed:	Spent 1,1,1-trichloroethane (F001) was generated in this system and pumped into a 55 gallon drum. The spent solvent was sent to the other degreaser to be recycled through the still.
Release Controls:	The unit is made of steel. Wastes were collected in a steel tank within the former degreaser. They were subsequently pumped out and transferred to the other unit (SWMU #7). An exhaust system was connected to the unit and carries emissions outside. There are no other release containment features.
Release History:	No releases have been documented.
Observations:	No signs of contamination were observed during the VSI. The floors were cracked and stained throughout the facility.

SWMU 6:	**Etch Bath**
Unit Description:	The etch bath is located just north of the tumbling and cleaning area in the central portion of Building 1. This unit consists of three open, horizontal steel tanks with approximate capacities of 25, 17 and 25 gallons, respectively. The two 25 gallon tanks contain sodium nitrite etching solution and the 17 gallon tank contains rinse water. The etch bath is designed to remove undesirable metals from the surface of a particular part. Parts are dipped in heated tanks of etch in steel mesh baskets followed by a rinse. Waste sodium nitrite collects in the bottom of the tank and is pumped into drums twice a year. The unit includes an exhaust system located above both etch tanks.
Date of Startup:	1978.(possibly prior to this date under P.R.Mallory's ownership)
Date of Closure:	This unit is currently in operation.
Wastes Managed:	Approximately 60 gallons of waste sodium nitrite (D001) are collected annually in the tanks and are transferred to steel drums. The drums are then manifested off-site by Envirosolv.
Release Controls:	The waste is contained in open steel tanks which are elevated from the concrete floor. An exhaust system is located directly above both etch tanks. There are no other release controls.
Release History:	No releases have been documented.
Observations:	Past spills of sodium nitrite were observed on the tops and sides of tanks and on the floor in between the tanks. In addition, a wooden skid located west and adjacent to the unit was stained. The source of the stain is unknown. Due to the age of the facility, the floors were cracked and stained throughout.

SWMU 7:	**Degreaser**
Unit Description:	This unit is located in the southwest area of Building 1, near the south wall. It is approximately 12 feet high, 5 feet wide and 27 feet long and is made of steel. Parts are sent through the unit in steel baskets to be degreased. Three different solvent tanks are situated in the unit: the first tank contains heated solvent, the second tank contains cool/clean solvent and the third tank contains spent solvent. The spent solvent is pumped periodically to a still which is attached to the unit. The still heats the spent solvent. Clean solvent vapors rise from the still and condense on a cold collector by using cooling water. Heat exchange cooling water never comes in contact with the solvent and is discharged to the sewer. The clean solvent is then drained through a trough back to the clean/cool solvent tank. Contaminants and oil that remain in the still collect in the bottom and form still bottoms. The still bottoms are drummed and manifested off-site. An exhaust system is located directly above the unit.
Date of Startup:	1978.(possibly prior to this date under P.R.Mallory's ownership)
Date of Closure:	This unit is currently in operation.
Wastes Managed:	Spent 1,1,1-trichloroethane still bottoms (F001)are generated in the still and are pumped to a drum for later disposal. Approximately 220 gallons of still bottoms are disposed of annually.
Release Controls:	The unit is made of steel. Waste solvent collects in a tank which drains to the still. The still recycles some of the solvent and collects oil and grease in the form of a still bottom. The still bottoms are pumped to a drum and later shipped off for disposal. An exhaust system is located directly above the unit. There are no other release controls.
Release History:	A foul odor was reported by a facility worker while working the degreaser in 1989. The unit was then moved and OSHA tested. The results showed no detectable levels in the air. No other releases have been documented.
Observations:	The concrete was stained in the area of this unit. In addition, a fan was blowing by a worker in this area. The floors were cracked and stained throughout the building.

SWMU 8:	**Powder Mix Area.**
Unit Description:	This unit is located between the tumbling and cleaning area and the degreaser along the south wall of Building 1. The unit consists of at least 4 mixers and encompasses an area of approximately 60 X 30 feet. Metal powders are mixed in this area with binders in order to assist the flow of powder in the press machines. These binders are located in two drums along the west wall in this area. The machines are made of steel and are underlain by concrete floors.
Date of Start-up:	1978.(possibly prior to this date under P.R.Mallory's ownership)
Date of Closure:	This unit is currently operating.
Wastes Managed:	Floor sweeps of spilled powders from the mixers contain a vinyl resin binder manufactured by Stanchem (D001, D035) and 1,1,1-trichloroethane (F002). Approximately 2700 pounds of used powder is generated and disposed of annually. Approximately 6900 pounds of used powder is sent out for reclamation annually.
Release Controls:	The powder mixers are kept in steel containers on a concrete floor. Facility workers mixing or weighing powders in this area are required to wear a double cartridge respirator. There are no other release controls.
Release History:	No releases have been documented in this area.
Observations:	During the VSI, spilled powders were noted on the floors in this area. A fan was blowing near a facility worker operating a sifting machine. The floors were cracked and stained throughout the building.

SWMU 9:	**Plating Lab.**
Unit Description:	This room is located in the plating department which is in the north half of building three. This area is both a testing and development area for silver, gold, cadmium, nickel and copper plating. The room is approximately 20 x 40 feet in dimension and contains approximately 56 open steel and plastic tanks containing approximately 668 gallons of various plating chemicals. All tanks in this area are elevated on steel trays over a concrete floor. The cyanide tanks are double walled. The typical procedure is to clean, rinse, plate, rinse and dry. Depending on the metal plated, the whole procedure, or parts of it, are repeated. Plating wastes are pumped into plastic drums on an as-needed basis and are sent to the drum storage area prior to shipment for disposal.
Date of Startup:	1978.(P.R.Mallory also operated this unit prior to 1978)
Date of Closure:	This unit is currently operating.
Wastes Managed:	Estimated amounts of plating wastes generated annually from this unit and the plating shop are as follows: 40 gallons of silver cyanide (F007), 10 gallons of copper cyanide (F007), 5 gallons of sulfuric acid (F009), 10 gallons of hydrochloric acid (F009), 0 gallons of ammonium persulfate (F009), 0 gallons of sodium phosphate (F009), 20 gallons of sodium cyanide (F007), 25 gallons of nickel hydrochloric (F009), Technic Tarnisolve (F009, no longer used as of 10/92), 7 gallons nickel sulfamate (F009), cadmium cyanide (F007, F008, no longer used as of 3/92), unknown amounts of sulfamic acid (F009), unknown amounts of Lectroless nickel solution (F009), unknown amounts of nickel strike (F009), unknown amounts of tin stripper (F009), unknown amounts of trisodium phophate (F009), unknown amounts of Technic Tarniban (F009), 0 gallons of nickel cyanide (F007), 0 gallons of potassium cyanide (F007), and 15 gallons of gold cyanide (F007).
Release Controls:	Steel and plastic tanks are elevated and situated on catch trays over a concrete floor. There are no other release controls.
Release History:	No releases have been documented.
Observations:	During the VSI, white precipitate was noted on the side of one of the plastic tanks containing nickel sulfamate. In addition, it appeared that routine dripping was occurring on the sides of tanks and on the floor below the tanks. Rain water was noted in this area. The floors were cracked and stained as in other parts of the facility.

SWMU 10: **Plating Shop.**

Unit Description: This room is nearly 1500 square feet in size and is located in the northern half of Building #3, north of the plating lab. This unit consists of approximately 63 steel tanks which vary in size and contain various plating solutions. The combined capacity of all tanks totals 6,970 gallons. An electrowinning machine is situated in the southwest corner of this area and is used to reclaim silver (excluded under 40 CFR 261.4.). Parts are plated with the following metals in this area: silver, copper and nickel. The typical procedure is to clean, rinse, plate, rinse and dry. Depending on the metal plated, the whole procedure, or parts of it, are repeated. Parts are dipped in the tanks via an overhead hoist system. All tanks are underlain by a concrete floor which contains sewer drainage channels. Any dripping from the transfer of parts from tank to tank is channeled to the building sewer system. The sewer system is monitored by Contact Metals Welding as well as the City of Indianapolis Department of Public Works. All water which enters this system is treated by the City prior to release. Elevated wooden plank walkways separate plating assemblies and are situated over drainage channels. Two former cadmium cyanide plating tanks were located in the north and central area of the shop and contained 1,045 gallons of waste cadmium cyanide solution and 330 gallons of waste sludge. This was drained and disposed by Cyanochem in 1992. Currently there are 5 tanks covered with plastic sheets because they are infrequently used. These tanks are located near the south wall and contain approximately 180 gallons of nickel strike, 930 gallons of silver cyanide and 460 gallons of cleaning and rinsing solutions. Plating wastes are pumped into plastic drums on an as-needed basis and are sent to the drum storage area prior to shipment for disposal.

Date of Startup: 1978.(P.R.Mallory operated this unit prior to this date)

Date of Closure: This unit is currently in operation.

Wastes Managed: Plating wastes generated in this area are the same as those listed for SWMU #9 and include: silver cyanide (F007), copper cyanide (F007), sulfuric acid (F009), hydrochloric acid (F009), ammonium persulfate (F009), sodium phosphate (F009), sodium cyanide (F007), nickel hydrochloric (F009), Technic Tarnisolve (F009, no longer used as of 10/92), nickel sulfamate (F009), sulfamic acid (F009), Lectroless nickel solution (F009), nickel strike (F009), tin stripper (F009), trisodium phosphate (F009), Technic Tarniban (F009), nickel cyanide (F007), and potassium cyanide (F007). The only exceptions are gold cyanide and cadmium cyanide.

Release Controls: The tanks are constructed of steel and are separated by elevated wooden walkways over a concrete floor. Drainage channels, channeled to the building sewer system (SWMU #18), underlie the tanks. Exhaust systems are located over some of the tanks. Two fans were built into the south wall of the plating shop. There are no other release controls.

Release History: No releases have been documented in this area.

Observations: During the VSI, it appeared that routine dripping was occurring between the plating tanks during the transfer of parts from one tank to the next. The tanks had drip marks on them, and the surrounding floor and wooden walkways were stained black. The concrete floor was eroded in numerous areas and spills and stains were observed throughout the shop. Ventilation was poor. The building walls, windows and tanks were in a deteriorated condition. Rain was leaking from the ceilings after a heavy rainstorm. A plating employee was observed working without gloves, boots or protective clothing.

SWMU 11:	**Plating Solution Waste Storage Area.**
Unit Description:	This unit is a small drum storage area located in the northeast corner of the plating shop. The drums are constructed of plastic and hold 16, 50 and 55 gallons. Approximately 4-50 gallon, 8-55 gallon and 2-16 gallon drums are elevated on wooden platforms which are situated on a concrete floor.
Date of Startup:	1978.
Date of Closure:	This unit is currently in operation.
Wastes Managed:	The following wastes are stored in this area: silver cyanide (F007), copper cyanide (F007), sulfamic acid (F009), Lectroless nickel solution (F009), nickel strike (F009), nickel plating solution (F009), Technic Tarniban (F009), stripping/cleaning cyanide solution (F007), trisodium phosphate (F009), and tin stripper (F009).
Release Controls:	Most of the wastes are contained in plastic drums on elevated containment centers over a concrete floor. There are no other containment features.
Release History:	No releases have been documented.
Observations:	No releases were observed during the VSI. The containment centers are separated by drainage canals which run north to south and are covered with wooden slats. These canals drain into the building sewer system. Other 55 gallon plastic and steel drums are located near the waste storage area and contain product solvents.

SWMU 12:	**Final Silver Cleaning Unit**
Unit Description:	This unit is located adjacent and to the west of the Plating Lab and along the west wall of Building 3. This unit covers approximately 20 square feet and consists of a hexagon tumbler (wash tub) which is made of rubberlined steel. The wash tub is elevated on a steel tray apparatus and is underlain by a concrete floor. Wastes are drained and collected in plastic drums as needed. A sewer drainage channel runs beneath the unit and an exhaust system is located above. Three 16 gallon drums of clean hydrogen peroxide and 1 plastic carboy of ammonium persulfate product (100 lbs.) are located just north of the unit on the concrete floor.
Date of Startup:	1978.
Date of Closure:	This unit is currently in operation.
Wastes Managed:	According to a facility representative, the ammonium persulfate (F009) is consumed in the cleaning process. Approximately 110 gallons of waste potassium cyanide (F007) is generated at this unit annually.
Release Controls:	A steel tray underlies the wash tub. The unit is elevated over a concrete floor. There are no other containment features.
Release History:	No releases have been documented in this area.
Observations:	Floors in this room were cracked and stained. The ceiling was dripping water after heavy rains during the VSI.

SWMU 13:	**Drum Storage Area in Building 3**
Unit Description:	This unit is located adjacent to south of the plating lab and is approximately 60 feet x 20 feet in dimension. The unit currently consists of 35 55-gallon and 62 30-gallon drums of both product and waste, and has a total storage capacity of 100 55-gallon drums. All drums are either polystyrene or steel and are situated on wooden skids over a concrete floor. The following products are also stored in this area: new hydraulic and lubricating oil and Trimsol concentrate (wastes are described below). All hazardous wastes stored in this area are to be held under 90 days. Once the drums reach storage, they are analyzed (depending on the waste), labelled and manifested off-site for reclamation or disposal.
Date of Startup:	1978.
Date of Closure:	This unit is currently operating.
Wastes Managed:	The following wastes are currently stored in this unit: used cutting oil, metal scrap, and used metal powders.
Release Controls:	All drums are made of steel and situated on wooden skids over a concrete floor. Waste metal scrap is placed in drums on a concrete floor. No other containment features exist.
Release History:	No releases have been documented.
Observations:	The concrete floors were cracked and stained. Some of the drums were dented and in poor condition. Wooden skids in the area were also in poor condition. The facility asserted that dented drums are used for non-hazardous waste storage; however, it was difficult to confirm this during the VSI. Rain water was dripping through the ceiling.

SWMU 14: **Drum Storage Area in Building 4**

Unit Description: This unit is located in the northern portion of Building 4 and is approximately 70 feet x 30 feet in dimension. This area has a storage capacity of approximately 65-55 and 15-16 gallon drums of products and wastes. The following products are stored in this area: ammonia and sulfuric acid (wastes are described below). All hazardous wastes placed in this area can only be stored under 90 days. Hazardous waste sent to this unit is analyzed (depending on the waste), labelled and manifested off-site for proper disposal. A portable ultra filtration unit (PUFSE), located in the middle of the drum storage area in the north portion of building four, is used to recover Trimsol, a coolant and lubricant. The system consists of a filter that fits on top of a plastic collecting tank. Approximately 15% is recovered and reused at the facility. The remaining 85% is drummed and sent off-site for disposal.

Date of Startup: 1989.

Date of Closure: This unit is currently operating.

Wastes Managed: Wastes currently stored in 16 gallon drums in this area include: spent sodium bisulfate, spent hydrochloric (D002), F009) and spent Metex. Wastes currently stored in 55 gallon drums are as follows: waste oil, used latex/coagulant, used Trimsol, graphite dust, Rotoclone water, silver cast unit water (D011), silver (D011), 1,1,1-trichloroethane still bottoms (F001), waste sodium nitrite (D001), nickel solids, nickel sulfamate (F009), cyanide solution (F007), spent sodium bisulfate, spent hydrochloric (D002, F009), spent Metex, spent trisodium phosphate (F009), spent sodium cyanide (F007), spent gold cyanide (F007), spent nickel hydrochloric (F009), spent nickel sulfate (F009), and Technic Tarnisolve (F009, no longer used).

Release Controls: All wastes are stored in 16 and 55 gallon steel or polystyrene drums and most are elevated on wooden skids or containment centers. The floors consist of linoleum covered concrete. There are no other containment features.

Release History: No other releases have been documented in this area.

Observations: Many of the 55 gallon steel drums appeared rusty and dented. Some of the 55 gallon drums containing Rotoclone wastes were uncovered. Non-hazardous latex drums were also uncovered. Some of the wooden skids were in poor condition. The floors were stained and cracked. The stains were oily in appearance, and one black stain was covered with a sand-like material.

SWMU 15: **Former Drum Storage Area.**

Unit Description: This unit is located outside in a former rail spur, adjacent to and south of Building 1. The dimensions of this area are approximately 130 feet x 20 feet. The area was used as drum storage for non-hazardous latex, sodium nitrite, cleaning solutions, degreaser still bottoms, organic solvents and used cutting oils. When CMW took over operations in 1978, 120 drums (mostly 55 gallon steel containers) containing the above materials were left in this area. In 1981, CMW began operation of this area as a staging area for returnable drums and simultaneously began cleanup of the remaining P.R. Mallory drums. By 1987, all drums were disposed of. A small fraction of those were reclaimed. In December of 1990 approximately 400 cubic yards of contaminated soils and an underground gas storage tank were excavated from the area. The unit consists of the remaining deep impacted soils that were not removed due to the possibility of undermining adjoining building structures.

Date of Startup: Unknown date prior to 1978.(under P.R.Mallory)

Date of Closure: All drums were removed in 1987. Soil excavation occurred in 1990.

Wastes Managed: The following wastes were stored in 55 (and some 5,16, 50 and 60-gallon) gallon steel drums in this area: used latex, sodium nitrite (D001), used oils, cleaning solutions (D001, D008), and degreaser still bottoms (F001). Soil analyses conducted in 1988 indicate volatile organic compound contamination.

Release Controls: Wastes were contained in steel drums. There are no other release controls.

Release History: A 1986 IDEM RCRA facility inspection noted stained soils in the area. Soils were sampled in 1988 revealing a prior release(s) of waste solvents. In addition, a former P.R. Mallory employee has stated that he recalled drums of solvent being dumped in this area when drums were scarce.

Observations: The area is currently covered with clean fill and gravel.

SWMU 16:	**Contaminated Soil Waste Piles**
Unit Description:	This unit is located approximately 20 feet south of Building 1 and consists of two waste piles that resulted from the 1990 soil excavation in the former drum storage area. The waste piles contain 400 cubic yards of contaminated soils and concrete. The waste pile dimensions are approximately 15'x 150' and 30'X 8', respectively, and they are located directly east of the former drum storage area.
Date of Startup:	1990.
Date of Closure:	Currently, the soil is being characterized for proper disposal.
Wastes Managed:	Soil analyses of samples collected from the waste piles by CMW in March of 1991 did not indicate any hazardous constituents. Potential wastes are listed in the wastes managed section for the former drum storage area (SWMU #15). These include: used latex, sodium nitrite (D001), used oils, cleaning solutions (D001, D008), and degreaser still bottoms (F001).
Release Controls:	The soil was stockpiled onto plastic sheets and subsequently covered with plastic sheets. There are no other release controls.
Release History:	No releases have been documented in this area.
Obervations:	Wooden skids and boulders were thrown on the plastic tarps to keep them in place. Due to heavy rains, puddles of water were noted near the waste piles. A wire fence borders the waste piles on the south side.

SWMU 17:	**Sewer System - Building 1**
Unit Description:	This unit consists of sewer drainage channels which underlie all manufacturing processes in Building 1.
Date of Startup:	1978.(possibly prior to this date under P.R.Mallory's ownership)
Date of Closure:	This unit is currently operating.
Wastes Managed:	The following wastes are monitored by the City of Indianapolis Department of Public Works: copper, cadmium, total cyanide, silver, nickel, fluoride, molybdenum, total chromium, lead, zinc and oil and grease.
Release Controls:	Sewer water is tested at 3 points daily by the facility and 3 times a week by the City of Indianapolis. There are no other release control mechanisms.
Release History:	Wastewater discharges from the facility on November 2 and 6, 1989 and December 5 and 20, 1989 were outside the acceptable pH range. In addition, recent self monitoring reports (10/92) filed to the City from the facility revealed exceedences for a variety of the parameters listed above under wastes managed.
Observations:	No signs of contamination were observed in the sewer in this building.

SWMU 18:	**Sewer System - Building 3**
Unit Description:	This unit consists of the sewer system in Building 3. Sewer drainage channels were observed running parallel to cleaning and plating tanks in the plating shop in the final silver cleaning unit room. In addition, channels were also observed in the product drum storage area in the plating shop.
Date of Startup:	1978.(possibly prior to this date under P.R.Mallory's ownership)
Date of Closure:	This unit is currently operating.
Wastes Managed:	The following wastes are managed by the City of Indianapolis Department of Public Works: copper, cadmium, total cyanide, silver, nickel fluoride, molybdenum, total chromium, lead, zinc, and oil and grease. Due to drippage from the transfer of parts from one tank to the next other wastes could include any of the wastes associated with the plating shop. (SWMU #10)
Release Controls:	Sewer water is tested at 3 points daily by CMW and 3 times a week by the City. No other release controls exist.
Release History:	Wastewater discharges from the facility on Nov. 2 and 6, 1989 and Dec.5 and 20, 1989, were outside the acceptable pH range. Recent self-monitoring results (10/92) submitted to the City from the facility revealed exceedences for a variety of the parameters listed above under wastes managed.
Observations:	During the VSI, rust colored solids were observed floating in a liquid in the drainage channel.

4.0 AREAS OF CONCERN

Five areas of concern (AOCs) were identified during the PA/VSI:

AOC 1: Loading Dock.
AOC 2: Engineer Test Area.
AOC 3: Ultra Sonic Degreaser.
AOC 4: Indoor Drive-in in Plating Shop.
AOC 5: Graphite Room.

The loading dock (AOC #1) is located in the northeast corner of Building 1 and adjacent to Building 2. The area consists of a driveway and dock area. The dock area is approximately 15 X 15 feet and contains a concrete floor. All hazardous wastes generated at the facility are transported from the waste holding area to this area one day before pick up. A spill of approximately 5 gallons of waste cadmium cyanide solution was reported in this area in March of 1992. Apparently a drum containing waste cadmium cyanide dropped 6" from a skid while loading the drum into a truck. The area was immediately remediated and no signs of contamination were observed in the driveway during the VSI. The spill was a one time occurence according to the documented release history; therfore, because hazardous wastes are not stored here, the dock area is listed as an AOC.

The Engineer Test Area (AOC #2) is situated in a central location on the west side of Building 2 and encompasses approximately 3,475 square feet. The area consists of a product storage area for metal powders (including ferrous powders) and two furnaces. The product powders were stored in 20 gallon steel drums both on wooden skids and on the concrete floor. The test area was not observed during the VSI. Rain water was leaking near the area and the overall condition of the building appeared deteriorated. There is no evidence of routine or systematic releases in this area. This area is considered an AOC due to the fact that the building is deteriorated in this area and product is stored here.

AOC #3, the Ultra Sonic Degreaser is located along the west wall in the plating shop in Building 3. This unit is rectangular in shape and contains two enclosed steel tanks which have capacities of 7 gallons of 1,1,1,-trichloroethane solvent each. When the solution is saturated, it is pumped out into a drum and transported to the still of the large degreaser in Building 1 where it is recycled. This unit was not considered a SWMU due to the enclosed nature of the tanks and due to the fact that the saturated solvent is reused in the other degreaser (SWMU #7). This unit is listed as and AOC because hazardous wastes are generated here.

The indoor drive-in in the plating shop (AOC #4) is located on the far north end of Building 3 and is approximately 20 feet x 80 feet in dimension. This area serves as a product storage area for plating caustics and cyanide solutions. Plastic drums (55 gallon) located on the north wall contain the following products; sodium hydroxide, potassium hydroxide, electro/chemical 402 and udyprep 268. These drums are elevated on a concrete pad. A small storage area for approximately 10-55 gallon steel drums of product cyanide solutions is fenced and locked in the northwest corner. During the VSI, rain was observed seeping from the ceiling into this area, flooding the whole area and exiting the building. The following day, a small pool remained which had an oil-like sheen on its surface. The area is considered an AOC becuase it did not seem adequate for sound storage of product due to deterioration of the building and the evidence of flooding.

AOC #5, the graphite room, is located in the southeast corner of Building 3. The room is approximately 100 square feet and consists of a graphite machine and dust collector. Graphite "boats" are manufactured in this area which are used as parts holding fixtures for heat treating, sintering, and brazing operations. Occasionally (less than once a month) these "boats" are made with transite, an

asbestos containing material. All dust collected from both graphite and graphite/transite processes is collected in the dust collector. The dust collector is cleaned out approximately 10 times a year. The dust is wetted down, placed in 3 millileter plastic bags, labeled and sent to the Southside Landfill for disposal. A total of 5,590 pounds of graphite dust with asbestos has been generated since 1990. Facility workers operating with transite are required to wear protective clothing and a respirator. Only 1 sheet (5 X 7 feet) of transite remains to be used. It is no longer a part of CMW's product line. This area, never used for hazardous waste storage, is considered an AOC because transite is considered a hazardous material by TSCA.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The PA/VSI identified 18 SWMUs and 5 AOCs at the Contacts Metals Welding, Inc. facility in Indianapolis, Indiana. The following are Metcalf and Eddy's conclusions and recommendations for each SWMU and AOC. (See Table 3 for a summary of suggested further actions for all SWMUs and AOCs.)

SWMU 1 **Silver Cast Unit.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 1 and contains a Rotoclone water scrubber which captures cadmium from the air and settling pits which collect silver sludge and water. Silver casting is conducted on average twice a week.

Recommendations: No further action is recommended at this time. If operations at this unit increase, air monitoring of rotoclone unit emissions is recommended.

SWMU 2 **Pickling and Rinse Tanks.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 1, therefore releases are contained in the building. There is potential for facility workers to come into contact with spilled material at this unit. Evidence of past dripping was noted at this unit during the VSI.

Recommendations: Installation of secondary containment features is recommended.

SWMU 3 **Tumbling and Cleaning Area.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 1, therefore releases are contained in the building. There is potential for facility workers to come into contact with spilled material at this unit. Evidence of past dripping was noted at this unit during the VSI.

Recommendations: Installation of secondary containment features is recommended.

SWMU 4 **Parts Washers.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The units are located inside facility buildings, therefore releases are contained in the buildings. In addition, the units are serviced monthly by Heritage Environmental.

Recommendations: units The washers were not observed during the VSI; therefore, inspection of these is recommended to ensure proper containment is provided.

SWMU 5 **Former Degreaser.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 1 and has been out of operation since March of 1991.

Recommendations: No further action is recommended.

SWMU 6 **Etch Bath.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 1, therefore releases are contained in the building. There is potential for facility workers to come into contact with spilled material at this unit. Evidence of past spills was noted at this unit during the VSI.

Recommendations: Installation of secondary containment features is recommended.

SWMU 7 **Degreaser.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 1, therefore releases are contained in the building. There is potential for facility workers to come into contact with solvent material at this unit. Floor stains were noted in the unit area and a facility worker was operating the unit near a fan.

Recommendations: Restricted use of fans and air monitoring is recommended at this unit.

SWMU 8 **Powder Mix Area.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 1, therefore releases are contained in the building. There is potential for facility workers to come into contact with spilled material at this unit. Evidence of spills was noted at this unit during the VSI. CMW employees are required to wear protective clothing including a respirator at this unit while mixing and weighing.

Recommendations: Protective clothing including a respirator is recommended also during sweeping of powders.

SWMU 9 **Plating Lab.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 3, therefore releases are contained in the building. There is potential for facility workers to come into contact with spilled plating solutions at this unit. Evidence of spills were noted at various tanks during the VSI. It is possible that some of this spilled

material does get into the sewer system, but this water is treated by the City before it is released as surface water. In addition, rain was observed dripping from building ceilings during the VSI.

Recommendations: Installation of secondary containment features is recommended. Building structure improvement plans should be implemented to prevent pooling in buildings during storms.

SWMU 10 **Plating Shop.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, and air from this unit. The unit is located inside Building 3, therefore releases are contained in the building. Due to the deteriorated condition of floors in the area there is a moderate potential for a release to the soil. There is potential for facility workers to come into contact with spilled plating solutions at this unit. Evidence of spills were noted on tanks and on floors and walkways during the VSI. There is a low patential for contaminants to reach the surface water from these spills because water is sent through the building sewer system to the Publically Operated Treatment Works. Air ventilation was poor and a facility employee was observed plating without protective gloves or boots. In addition, rain was observed dripping from building ceilings during the VSI.

Recommendations: Installation of secondary containment features is recommended. Enforcement by the facility of protective clothing requirements for their employees is also recommended. Building structure improvement plans should be implemented to prevent pooling in buildings during storms.

SWMU 11 **Plating Solution Waste Storage Area.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 3, therefore releases are contained in the building. Rain was observed dripping from building ceilings during the VSI.

Recommendations: Installation of secondary containment features is recommended. An additional inspection is recommended at all drum storage areas to ensure proper labelling and 90 day storage requirements are met. Building structure improvement plans should be implemented to prevent pooling in buildings during storms.

SWMU 12 **Final Silver Cleaning Unit.**

Conclusions: There is presently a low potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 3, therefore releases are contained in the building. There is a potential for facility workers to come into contact with spilled plating solutions at this unit. Evidence of past dripping was noted on the unit and on the floor. Rain was observed dripping from building ceilings during the VSI.

Recommendations: Installation of better secondary containment features is recommended. Building structure improvement plans should be implemented to prevent pooling in buildings during storms.

SWMU 13 **Drum Storage Area in Building 3.**

Conclusions: There is presently a low to moderate potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 3, therefore releases are contained in the building. There is a potential for facility workers to come into contact with wastes stored in this unit due to the following observations. Some of the drums containing wastes were dented and some of the wood skids holding the drums were in poor condition. The floors were cracked and had black stains. Rain water was observed dripping through the ceiling.

Recommendations: Installation of secondary containment features is recommended. An additional inspection is also recommended at all drum storage areas to ensure proper labelling and 90 day storage requirements are met. Dented drums in this area should also be inspected for their contents. Building structure improvement plans should be implemented to prevent pooling in buildings during storms.

SWMU 14 **Drum Storage Area in Building 4.**

Conclusions: There is presently a low to moderate potential for a release to occur to groundwater, surface water, soil and air from this unit. The unit is located inside Building 4, therefore releases are contained in the building. There is a potential for facility workers to come into contact with wastes stored in this unit due to the following observations. Some of the drums containing wastes were dented or uncovered and also some of the wood skids holding the drums were in poor condition. The floors were cracked and had black stains.

Recommendations: Installation of secondary containment features is recommended. An additional inspection is also recommended at all drum storage areas to ensure proper sealing, labelling and 90 day storage requirements are met. Dented drums in this area should also be inspected for their contents.

SWMU 15 **Former Drum Storage Area.**

Conclusions: There is presently a low potential for a release to occur to surface water and air from this unit. There is a high likelihood for continued releases to soils and groundwater due to the following facts. Soil excavation activities conducted in December of 1990 revealed increasing concentrations of solvents at increasing depths. Soil excavation halted before all impacted soils were removed.

Recommendations: Remedial investigations including soil/groundwater sampling and the selection of an appropriate remedial technology is recommended as soon as possible.

SWMU 16 **Contaminated Soil Waste Piles.**

Conclusions: There is a moderate potential for a release to groundwater, surface water, soil and air from this unit. The waste piles were placed on and then covered with plastic tarps after soil excavation activities were conducted. Water pooling on the plastic could carry off contaminants and/or any organics in the waste piles could volatilize into the air.

Recommendations: Waste characterization of the waste piles should be expedited to ensure timely cleanup and disposal.

SWMU 17 **Sewer System-Building 1.**

Conclusions: There is currently a low potential for a release to groundwater, soil and air from this unit. CMW has exceeded the limits for a number of wastewater parameters on a regular basis. In addition, rust colored solids were noted in sewer drainage channels in the plating shop during the VSI. However, there is a low potential for a release to surface water because Indianapolis sewer water is treated for constituents released by CMW prior to release to the White River. See Appendix E for CMW's wastewater permit and self-monitoring results.

Recommendations: Ongoing negotiations between the facility and the City of Indianapolis regarding wastewater discharge standards for various facility processes should be resolved as soon as possible to ensure that proper discharge standards are set. Once the standards are set, proper enforcement activities are recommended to ensure facility compliance.

SWMU 18 **Sewer System-Building 2.**

Conclusions: There is currently a low potential for a release to groundwater, soil and air from this unit. CMW has exceeded the limits for a number of wastewater parameters on a regular basis. However, there is a low potential for a release to surface water because Indianapolis sewer water is treated for constituents released by CMW prior to release to the White River. See Appendix E for CMW's wastewater permit and self-monitoring results.

Recommendations: Ongoing negotiations between the facility and the City of Indianapolis regarding wastewater discharge standards for various facility processes should be resolved as soon as possible to ensure that proper discharge standards are set. Once the standards are set, proper enforcement activities are recommended to ensure facility compliance.

TABLE 3
SWMUs, AOCs, AND SUGGESTED FURTHER ACTIONS

SWMU	Operational Dates	Evidence of Release	Suggested Action
1. Silver Cast Unit	1967 to Present	None.	None.
2. Pickling and Rinse Tanks.	1978 to Present	White streaks on side of tanks and concrete pad below.	Install secondary containment features.
3. Tumbling and Cleaning Area	1978 to Present	Stains on tanks and floor below.	Install secondary containment features.
4. Parts Washers	1978 to Present	None.	Inspect parts washers because not observed during the VSI.
5. Former Degreaser	1978 to Present	None.	None.
6. Etch Bath	1978 to Present	$NaNO_3$ on sides and tops of tanks. Waste solids and stains on the floor.	Install secondary containment features.
7. Degreaser	1978 to Present	Stains on concrete below unit. Foul odor.	Restrict use of fans. Use air monitoring equipment in the area.
8. Powder Mix Area	1978 to Present	Spilled powders on the floors.	Protective clothing (including respirator) should be enforced also while sweeping powders.
9. Plating Lab	1978 to Present	White precipitate on the nickel sulfamate tank. Stains and spills on tanks and floor below.	Install secondary containment features. Improve building structure.

10. Plating Shop	1978 to Present	Spill marks on and between tanks. Floor and wooden walkways had stains and spills.	Install secondary containment features. Improve building structure. Appropriate personal protective clothing should be enforced.
11. Plating Solution Waste Storage Area	1978 to Present	None.	Install secondary containment features. Improve building structure.
12. Final Silver Cleaning Unit	1978 to Present	Cracked and stained floors.	Install secondary containment features. Improve building structure.
13. Drum Storage Area in Building 3	1978 to Present	Cracked and stained floors.	Install secondary containment features. Inspect dented drums. Improve building structure.
14. Drum Storage Area in Building 4	1989 to Present	Oily floor stains, incl. one covered with sand-like material.	Install secondary containment features. Inspect dented drums.
15. Former Drum Storage Area	1978 to 1987	None.*	Soil/groundwater sampling to determine proper remedial action.
16. Contaminated Soil Waste Piles	1990 to Present	None.	Expedite waste characterization of waste piles.
17. Sewer System - Building 1	1978 to Present	None.**	Resolve wastewater discharge standard conflicts.
18. Sewer System - Building 3	1978 to Present	None.**	Resolve wastewater discharge standard conflicts.

* Soils sampled in 1988 revealed a prior release of waste solvents. Soil was excavated in 1990.

** Wastewater discharges November 2 and 6, 1989 and December 5 and 20, 1989 were outside acceptable pH.

AOC	Operational Dates	Evidence of Release	Suggested Action
1. Loading Dock	1978 - Present	5 gallons of waste cadmium cyanide solution spilled in March, 1992.	Inspect all drums and drummed wastes.
2. Engineer Testing Area	1978 - Present	None	Inspect the two furnaces.
3. Ultra Sonic Degreaser	1978 - 1991	None	None
4. Indoor Drive-in in Plating Shop	1978 - Present	None	Install secondary Containment features or relocate drums. Improve building structure.
5. Graphite Room	1981 - Present	None	None

AOC 1 **Loading Dock.**

Conclusions: There is currently a low potential for a release to groundwater, surface water, soil and air from this unit because loading of wastes is conducted in an enclosed area from the building to the truck bed. There is a potential for workers to come into contact with wastes in this area due to possible handling of wastes in deteriorated drums.

Recommendations: Inspection of all drums and drummed wastes is recommended to ensure proper waste handling is performed.

AOC 2 **Engineer Test Area.**

Conclusions: There is presently a low potential for a release to groundwater, surface water, soil and air from this unit. The unit is located inside Building 2, therefore releases are contained in the building.

Recommendation: Inspection of the two furnaces is recommended because a thorough assessment was not made during the VSI.

AOC 3 **Ultra Sonic Degreaser.**

Conclusions: There is presently a low potential for a release to groundwater, surface water, soil and air from this unit. The unit is located inside Building 3, therefore releases are contained in the building. In addition, tanks holding solvents are situated inside a steel unit. This is considered an AOC because hazardous waste is generated here.

Recommendation: No further action is recommended.

AOC 4 **Indoor Drive-in in Plating Shop.**

Conclusions: There is presently a low potential for a release to surface water and air from this unit because the is located inside a garage in Building 3. There is a moderate potential for a release to soil and groundwater from this unit due to the following observations. During the VSI, rain was observed seeping from the ceiling into this area, flooding the whole driveway and exiting the building. The following day a small pool remained, containing an oily appearance.

Recommendation: Building structure improvement plans should be implemented to prevent flooding in this area during storms. Installation of secondary containment features or relocation of drums is recommended for this unit.

AOC 5 **Graphite Room.**

Conclusions: There is presently a low potential for a release to groundwater, surface water, soil and air from this unit. The unit is located inside Building 3, therefore releases are contained in the building. Facility employees are required to wear protective clothing including a respirator while working with transite. The use of transite has been discontinued, but this is still an area of concern because of the use of this material in the past.

Recommendation: No further action is recommended.

RECOMMENDATION SUMMARY:

The facility has made recent efforts to provide a safer working environment for their employees. The facility asserts that the drum containing used cadmium cyanide that spilled in March of 1992 was in good condition and the error was in unloading. The incident did cause the facility to reevaluate the conditions of their drums and drum storage areas. As a result, new drums and drum containment centers were noted during the VSI. CMW also has plans to phase out the use of some toxic chemicals. The use of cadmium cyanide has been terminated and non 1,1,1-trichloroethane degreasing equipment is currently being tested. In addition, the facility has a Health and Safety Medical Program for their employees including a FIT testing program and monthly exposure monitoring. The facility has plans to build their own wastewater treatment plant and to make structural improvements in Building 3. These plans are temporarily on hold pending the outcome of various issues. The facility is in disagreement with the City regarding wastewater discharge standards and with IDEM regarding characterization of the waste piles. Implentation of building improvement, sewage treatment, and remedial activities depends on the outcome of these discussions and associated financial implications.

To conclude, Metcalf and Eddy has determined that current operations and overall conditions at this facility do pose a moderate threat to its workers and a high threat to soils and groundwater. Therefore M&E recommends expedited negotiations between the facility and governing bodies to ensure timely implementation of the recommendations described herein.

REFERENCES

1. IDEM, February 19, 1986, CMW Notice of Violation, Indianapolis, Indiana.
2. IDEM, July 16, 1986, RCRA Notice of Inadequacy, Indianapolis, Indiana.
3. IDEM, November 4, 1985, Notice of Compliance, Indianapolis, Indiana.
4. IDEM, November 19, 1987, Enforcement Follow-up Inspection-Violation Letter, Indianapolis, Indiana.
5. ATEC, January 28, 1988, Site Assessment Plan, Indianapolis, Indiana.
6. IDEM, March 1, 1988, Notice of Approval, Indianapolis, Indiana.
7. IDEM, July 25, 1988, Letter of Inadequacy, Indianapolis, Indiana.
8. ATEC, June 10, 1988, Sampling and Analysis Report, Indianapolis, Indiana.
9. IDEM, September 30, 1988, Letter of Compliance, Indianapolis, Indiana.
10. ATEC, August 25, 1988, Sampling, Analysis and Cleanup Plan, Indianapolis, Indiana.
11. IDEM, October 26, 1988, Notice of Deficiency, Indianapolis, Indiana.
12. ATEC, December 9, 1988, Revised Sampling Analysis and Cleanup Plan, Indianapolis, Indiana.
13. IDEM, February 2, 1989, Notice of Acceptance, Indianapolis, Indiana.
14. ATEC, June 15, 1989, Letter to IDEM regarding Startup of cleanup activities, Indianapolis, Indiana.
15. IDEM, December 27, 1990, Letter to CMW regarding cleanup activities, Indianapolis, Indiana.
16. ATEC, March 7, 1991, Letter to IDEM regarding stockpiled soils, Indanapolis, Indiana
17. IDEM, March 15, 1991, Letter to CMW regarding time exztension, Indianapolis, Indiana.
18. IDEM, March 19, 1991, Letter to CMW requesting additional information, Indianapolis, Indiana.
19. CMW, March 27, 1991, Letter to IDEM regarding soil disposal and cleanup activities, Indianapolis, Indiana.
20. IDEM, April 8, 1991, Letter to CMW regarding time extension, Indianapolis, Indiana.
21. CMW, April 15, 1991, Letter to IDEM with information regarding soil disposal and cleanup, Indianapolis, Indiana.

22. IDEM, April 25, 1991, Letter to CMW rescinding special waste approval, Indianapolis, Indiana.

23. IDEM, April 26, 1991, Letter to CMW regarding time extension for soil disposal, Indianapolis, Indiana.

24. IDEM, January 9, 1986, Generator Inspection Report, Indianapolis, Indiana.

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36. Harrison, W., 1963, Bedrock Geology Map of Marion County, Indiana, Bloomington, Indiana.

37. Harrison, W., 1963, Map of Marion County, Indiana, Showing Thickness of Unconsolidated Materials, Bloomington, Indiana.

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42. CMW, October 1992, Response to Facility Letter, Indianapolis, Indiana.

43. CMW, June 26, 1992, U.S. EPA Form R, Indianapolis, Indiana.

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45. CMW, June 26, 1992, Tier Two Emergency and Hazardous Chemical Inventory Form, Indianapolis, Indiana.

46. CMW, November 6, 1992, Hazard Communication Program Information, Indianapolis, Indiana.

47. CMW, October 23, 1992, Plant Emergency Organization Information, Indianapolois, Indiana.

48. City of Indianapolis, December 28, 1990, Air Permit, Indianapolis, Indiana.

49. IDEM, March 10, 1992, Solid Waste Disposal Permit, Indianapolis, Indiana.

50. Municipal Court of Marion County, July 16, 1990, Agreed Judgment and Fine, Indianapolis, Indiana.

51. City of Indianapolis Department of Public Works, August 9, 1991, Letter to CMW regarding alternative flow measuring equipment, Indianapolis, Indiana.

52. City of Indianapolis Department of Public Works, January 21, 1992, Fact Sheet, Permit Modification for CMW, Indianapolis, Indiana.

53. CMW, March 27, 1992, Industrial Discharge Self-Monitoring Report for February, Indianapolis, Indiana.

54. CMW, November 16, 1992, Industrial Discharge Self-Monitoring Report for October, Indianapolis, Indiana.

APPENDIX A

VISUAL SITE INSPECTION SUMMARY AND PHOTOGRAPH LOG

VISUAL SITE INSPECTION SUMMARY
CONTACTS METALS WELDING, INC.
INDIANAPOLIS, INDIANA

Date:	November 12-13, 1992.
Facility Representatives:	Gary Collins, V.P. of Human Resources, Sue Young, Plant Nurse, and Dick Williams, Plant Manager.
State Representative:	None present.
Inspector:	Kristin Solberg, Metcalf and Eddy.
Weather Conditions:	11/12: Cloudy, heavy rain, approximately 40 degrees. 11/13: Partly cloudy, damp, near 50 degrees.
Summary of Activities:	The VSI began at 11 a.m. on November 12, 1992. Facility representatives met with the inspector to help provide information on prior site activities and conditions, release history, receptors and data gaps. A site walk-through was conducted from 1-4 p.m. on 11/12 and at 8 a.m. on 11/13 a.m. to identify the locations of SWMUs and AOCs. The potential for release of hazardous substances to the environment and probable pathways were assessed during the site inspection. Photographs were taken of most SWMUs and AOCs. Permission was granted by the facility to inspect and take photos. Due to the size of the facility, an extra half day was necessary to provide adequate documentation of the facility.

Photo No.: 24 (3rd roll) AOC No.: N/A
Date: 11/13/92 Time: 10:50 am Direction Facing: W
Photo Description: General photo of Facility - Loading area in corner

Photo No.: 19 1st roll SWMU No.: 1 : Silver Cast Unit
Date: 11/12/92 Time: 1:42 p.m. Direction Facing: E
Photo Description: Silver Cast Unit

Photo No: 20 1st roll SWMU No.: 2 : Pickling Rinse Area
Date: 11/12/92 Time: 1:43 p.m. Direction Facing: E
Photo Description: Pickling and Rinse Tanks
Note: Stains on tanks, concrete pad.

Photo No.: 15 (1st roll) SWMU No.: 3 : Tumbling/Cleaning Area
Date: 11/12/92 Time: 1:31 p.m. Direction Facing: S
Photo Description: Tumbling/Cleaning Area

Photo No: 14 (1st roll) SWMU No.: 5 Former Degreaser
Date: 11/12/92 Time: 1:30 p.m. Direction Facing: E
Photo Description: Former Degreaser in background.

Photo No.: 13 (Roll 1) SWMU No.: 6 : Etch Bath
Date: 11/12/92 Time: 1:30 p.m. Direction Facing: E
Photo Description: Etch Bath - Note: staining on tanks, floor.

Top

Bottom

Photo No: 14 (Roll 1) SWMU No.: 7 : Degreaser
Date: 11/12/92 Time: 1:09 p.m. Direction Facing: S
Photo Description: Operating Degreaser. Note: Fan, black staining.

Photo No.: 5 (Roll 1) SWMU No.: 7 Degreaser
Date: 11/12/91 Time: 1:09 p.m. Direction Facing: E
Photo Description: Drum containing still bottoms by degreaser.

Photo No: 8 (Roll 1) SWMU No.: 8 : Powder Mix Area
Date: 11/12/92 Time: 1:15 p.m. Direction Facing: S
Photo Description: Tungsten powder sifter, Note: powders on floor

Photo No.: 7 (Roll 1) SWMU No.: 8 : Powder ~~Store~~ Mix Area
Date: 11/12/92 Time: 1:15 pm. Direction Facing: W
Photo Description: Powder mix storage

Photo No: 1 (Roll 3) SWMU No.: 9 · Plating Lab
Date: 11/13/92 Time: 8:03 am. Direction Facing: N
Photo Description: Plating Lab Area

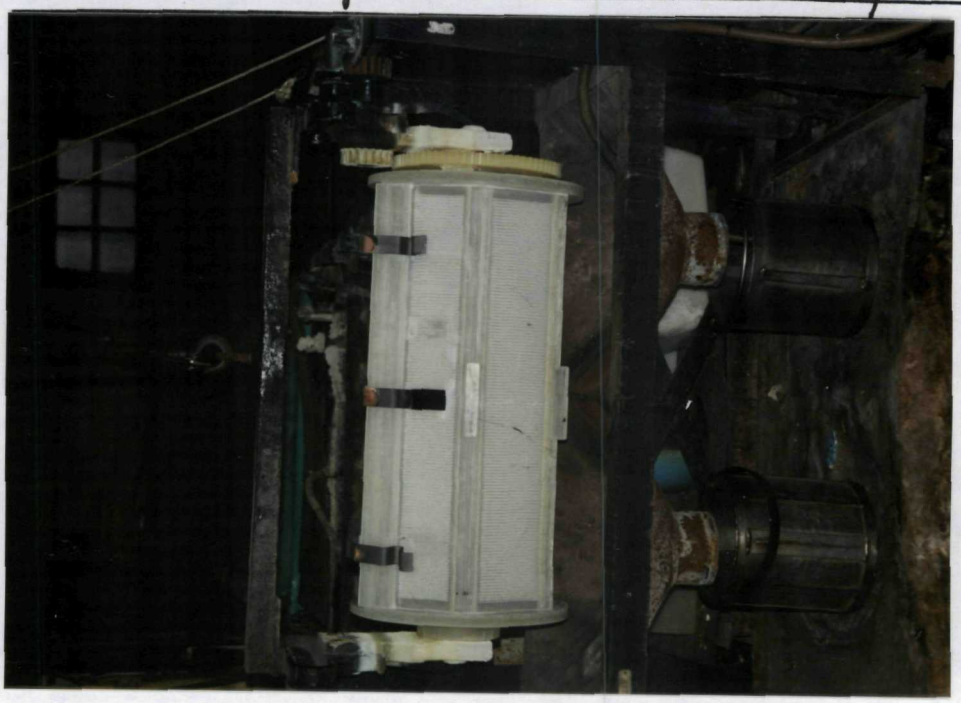
Photo No.: 24 (Roll 2) SWMU No.: 9 - Plating Lab
Date: 11/12/92 Time: 3:33 p.m. Direction Facing: S
Photo Description: Plating tanks in lab area, note stains, dripping.

Photo No: 26 (Roll 2) SWMU No.: 9 - Plating Lab
Date: 11/12/92 Time: 3:36 p.m. Direction Facing: NE
Photo Description: Plating Assembly for all metals

Photo No.: 25(Roll 2) SWMU No.: 9 - Plating Lab
Date: 11/12/92 Time: 3:34 p.m. Direction Facing: N
Photo Description: Nickel plating baths - note: white precipitate on tank

Photo No: 2(Roll 3) SWMU No.: 10: Plating Shop
Date: 11/13/92 Time: 8:07 a.m. Direction Facing: NE
Photo Description: Plating tanks on East wall in plating Shop

Photo No.: 3 (Roll 3) SWMU No.: Plating Shop - #10
Date: 11/13/92 Time: 8:09 a.m. Direction Facing: E
Photo Description: Close up of East Tank assembly - note: stains



Top

West Elevation

Photo No: 4 (Roll 3) SWMU No.: 10 - Plating Shop
Date: 11/13/92 Time: 8:10 a.m. Direction Facing: N
Photo Description: Dipping Hoist and container - Dry area

Photo No.: 14(Roll 3) SWMU No.: 10 - Plating Shop
Date: 11/13/92 Time: 8:23 a.m. Direction Facing: SE
Photo Description: Tank assembly in center of shop - Note: Staining

Photo No: 9 (Roll 3) SWMU No.: 10 - Plating Shop
Date: 11/13/92 Time: 8:17 a.m. Direction Facing: SW
Photo Description: Electrowinner - spinner in SW corner of shop.

Photo No.: 11(R0113) SWMU No.: 10 - Plating Shop
Date: 11/13/92 Time: 8:20 a.m. Direction Facing: E
Photo Description: Infrequently used tanks - covered.
Note fans on South wall, smoke in center-left, stains on walkways.

Photo No: 14(R0113) SWMU No.: 10- Plating Shop
Date: 11/13/92 Time: 8:23 a.m. Direction Facing: E
Photo Description: Tank assembly in east arm of shop.

Photo No.: 6 (Roll 3) SWMU No.: 11 - Plating Solution Waste Storage Area
Date: 11/13/92 Time: 8:16 a.m. Direction Facing: NE
Photo Description: Rear view of drum storage in plating shop.

Photo No: 7 (Roll 3) SWMU No.: 11 - Plating Solution Waste Storage Area
Date: 11/13/92 Time: 8:16 Direction Facing: East
Photo Description: Drum storage containment centers. Note sewer drainage channels beneath wood slats.

Photo No.: 16 (Roll 3) SWMU No.: 12 - Final Silver Cleaning Unit
Date: 11/13/92 Time: 8:24 a.m. Direction Facing: S
Photo Description: Silver hexagonal wash tub. Note: sewer behind unit.

Photo No: 17 (Roll 3) SWMU No.: 12 · Final Silver Cleaning Unit
Date: 11/13/92 Time: 8:27 a.m Direction Facing: N
Photo Description: Silver cleaning solutions

Photo No.: 2(Roll 2) SWMU No.: 13 - Drum Storage in Building 3
Date: 11/12/92 Time: 2:17 p.m. Direction Facing: SW
Photo Description: Drums containing waste Trimsol TM - note broken sk
dented drums

Photo No: 3 (Roll 2) SWMU No.: 13 - Drum Storage Area in Building 3
Date: 11/12/92 Time: 2:18 p.m. Direction Facing: W
Photo Description: Waste 1,1,1-trichloroethane & Trimsol storage
Note: Floor stains

Photo No.: 5 (R0112) SWMU No.: 13- Drum Storage in Building 3
Date: 11/12/92 Time: 2:21 p.m. Direction Facing: S
Photo Description: Waste Scrap (metals) Storage.

Photo No: 6 (R0112) SWMU No.: 13- Drum Storage Area in Building 3
Date: 11/12/92 Time: 2:21 p.m. Direction Facing: S
Photo Description: Waste powder Storage

Photo No.: 9 (R112) SWMU No.: 14 - Drum Storage in Building 4
Date: 11/12/92 Time: 2:31 p.m. Direction Facing: S
Photo Description: Waste oil Storage. Note: oil spill & Sand on E side.

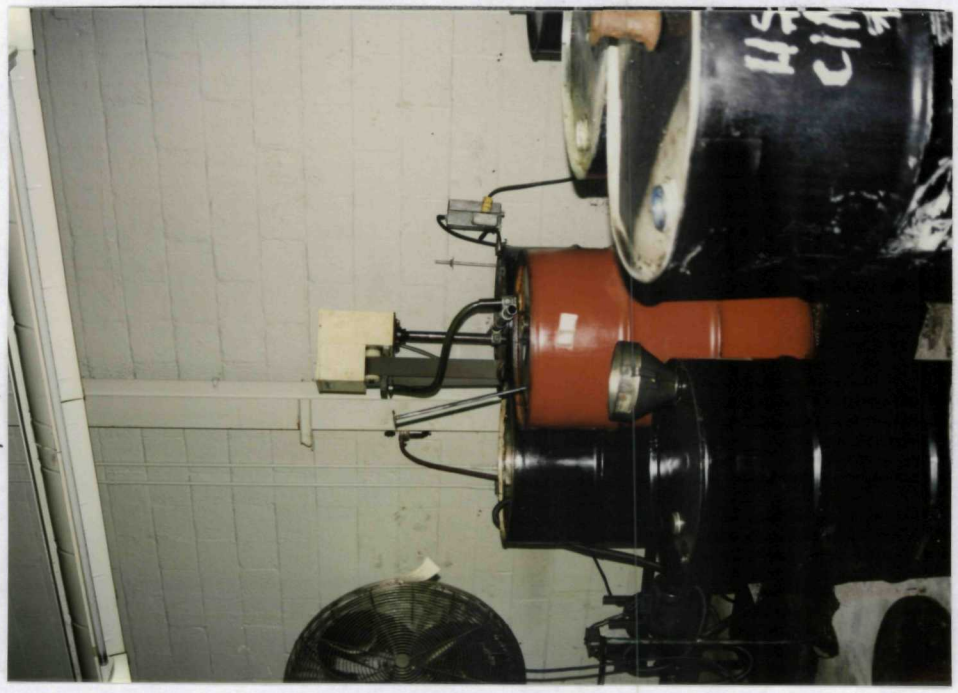


Photo No: 10 SWMU No.: 14 - Drum Storage Area in Building 4
Date: 11/12/92 Time: 2:31 p.m. Direction Facing: W
Photo Description: Oil Separator, drums of reclaimed oil.

Photo No.: 11 (Roll 2) SWMU No.: 14 - Drum Storage Area in Building 4.
Date: 11/12/92 Time: 2:32 pm. Direction Facing: SE
Photo Description: Waste oil storage - note staining

Photo No: 12 (Roll 2) SWMU No.: 14 - Drum Storage Area - Bldg 4
Date: 11/12/92 Time: 2:33 p.m. Direction Facing: S
Photo Description: Cyanide solutions.

Photo No.: 13 (Roll 2) SWMU No.: 14 - Drum Storage Area in Bldg 4
Date: 11/12/92 Time: 2:33 pm Direction Facing: N
Photo Description: Rotoclone water waste, graphite dust waste storage.

Photo No: 14 (Roll 2) SWMU No.: 14 · Drum Storage Area - Bldg. 4
Date: 11/12/92 Time: 2:34 p.m. Direction Facing: NW
Photo Description: Rotoclone unit - missing top filter

Photo No.: 15 (Roll 2) SWMU No.: 14 - Drum Storage in Bldg 4
Date: 11/12/92 Time: 2:35 p.m. Direction Facing: N
Photo Description: Latex storage (waste)

Photo No: 16 (Roll 2) SWMU No.: 14 - Drum Storage Area in Bldg 4
Date: 11/12/92 Time: 2:35 Direction Facing: N
Photo Description: Metex waste storage, hydrochloric acid product storage.

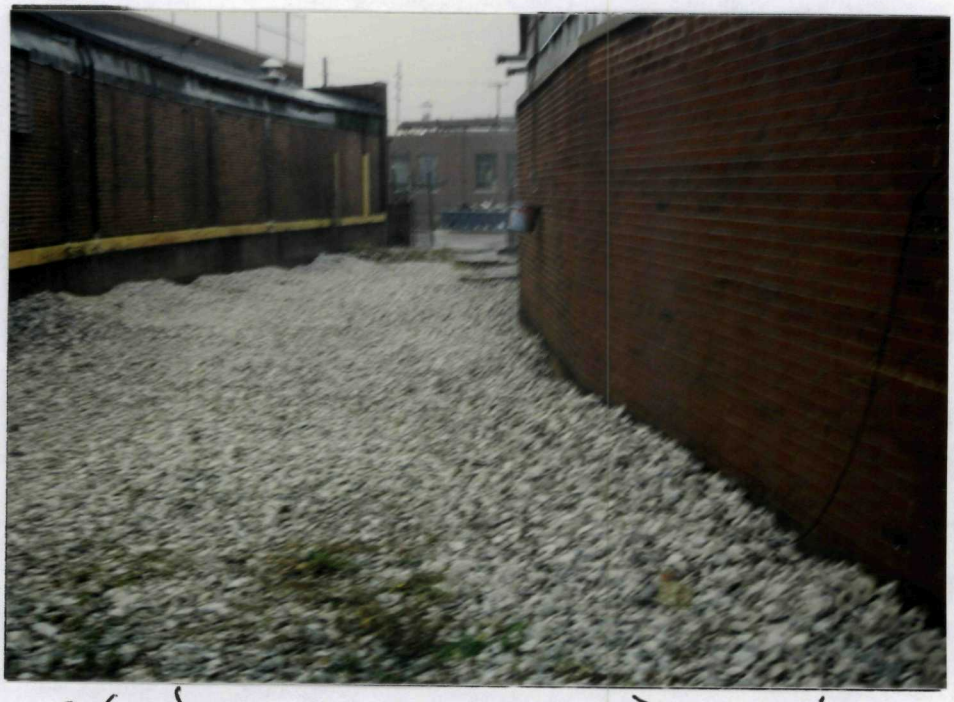


Photo No.: 21 (Roll 2) SWMU No.: 15- Former Drum Storage Area.
Date: 11/12/92 Time: 2:46 p.m. Direction Facing: W
Photo Description: Gravel fill in area of impacted soils

Top

Bottom

Photo No: 21 (3rd Roll) SWMU No.: 15- Former Drum Storage Area.
Date: 11/13/92 Time: 8:35 a.m. Direction Facing: SE
Photo Description: Gravel Fill-Former impacted area

Photo No.: 19(R112) SWMU No.: 16 - Contaminated Soil Waste pile - E
Date: 11/12/92 Time: 2:45 p.m. Direction Facing: SE
Photo Description: Note ponding during rain storm.

Photo No: 20(R112) SWMU No.: 16 - Contaminated Soil Waste Pile W
Date: 11/12/92 Time: 2:45 p.m. Direction Facing: SW
Photo Description: close-up of waste pile

Photo No.: 13 (Roll 3) SWMU No.: 18 - Sewer System - Bldg 3
Date: 11/13/92 Time: 8:22 a.m. Direction Facing: NW
Photo Description: Note - rust colored solids, staining.

Photo No: 25 (Roll 1) ASC No.: 2 - Engineer Test Area
Date: 11/12/92 Time: 2:10 p.m. Direction Facing: NE
Photo Description: product powder storage

Photo No.: 23 (Roll 2) AOC No.: 3 - Ultra Sonic Degreaser
Date: 11/12/92 Time: 3:30 p.m. Direction Facing: SW
Photo Description: Close-up of degreaser.

Photo No: 8 (Roll 3) AOC No.: 4 - Indoor Drive-in in Plating Shop
Date: 11/13/92 Time: 8:17 a.m. Direction Facing: S
Photo Description: Product plating storage on right and in background. Note: oil like stain - puddle in center.

Photo No.: 20(Roll 3) AOC No.: 5 - Graphite Room
Date: 11/13/92 Time: 8:34 a.m. Direction Facing: SW
Photo Description: outdoor shot of ~~photo~~ graphite shop

Photo No: 18(Roll 2) AOC No.: 5 - Graphite Room
Date: 11/13/92 Time: 2:41 p.m. Direction Facing: N
Photo Description: Duster and transit sheet in background.

APPENDIX B

VISUAL SITE INSPECTION FIELD NOTES

PA/VSI INSPECTION
CONDUCTED AT
CONTACTS METALS WELDING, INC.
IN
INDIANAPOLIS, INDIANA
ON
NOVEMBER 12-13, 1992

PERSONNEL PRESENT:

1. U.S. EPA CONTRACTOR — KRISTIN SOLBERG REPRESENTING METCALF & EDDY.

2. CONTAINS METALS WELDING, INC. — V.P. OF HUMAN RESOURCES — GARY COLLINS

3. CMW - PLANT NURSE SUE YOUNG

4. CMW - MAINTENANCE MANAGER DICK WILLIAMS

Schedule of Activities

11/12 - 1:00 pm meet w/ Gary Collins
11/12 - 1 - 4 - Site walk-through
11/12 - 4 - 4:30 - Discussion
11/13 - 8:00 am - 8:30 am - Additional Photos
11/13 - 8:30 - 10:00 am - Additional Questions.

Weather Conditions:

11/12 - Heavy Rain, cold - near 40° F.
11/13 - Sunny - partly cloudy warmer - near 50° F

Site Slope - nearly flat southward dip beginning between buildings 2 and 3

Previously identified SWMUs & AOCs:

SWMUs

1. Portable Ultra Filtration System
2. Vapor Degreasers
3. Fluidized Bed
4. Plating Solution Tanks
5. Drum Storage Area
6. Dust Collector
7. Waste Metal Scrap Process Area
8. Closed Drum Storage Area & impacted soil
9. Waste Piles (40 cubic yds. contam. soil and concrete)
10. Superior Boiler (?)
11. Power Master Boiler (?)

AOCs

1. Wood/Paper Incinerator
2. 3 Outdoor product Tanks - Hydrogen, Oxygen, Nitrogen

Ownership/operations

CMW acquired the assets of Duracell's (Formerly P.R. Mallory) metallurgical group in March 1978. Did this include the building and all equipment? Yes.

What kind of business was P.R. Mallory? They were a manufacturer of electrical capacitors?

Notes: CMW bought 3 buildings & associated land. A split of P.R. Mallory's metallurgical branch occurred where 3 people purchased the buildings & land and began CMW. As CMW, they leased the property in 1978 with the option to buy. The facility was bought in 1982 or 3.

P.R. Mallory owned and operated the facility from approximately the 1920's to 1978.

Number of Employees currently working? 196

What are the other facilities that border the CMW?

1. Indiana Liquidators to the west
2. An equipment auctioneer to the North
3. The railroad to the south.
4. Residential neighborhood to north and east
5. Metal shop to the South east.

Other land uses in the area (4 mile radius) are mostly urban, commercial, industrial & residential.

Approximate size of property: ? CMW looking up.

Regulatory Questions

Was a Part A or Part B permit application ever called in by EDOH? No.

Was interim status ever granted? Now unknown.

Other Permits?

Form R's were filed in July of 1992 stating approval for wastewater

Why were only 1,1,1-Trichloroethane & Copper compounds addressed in Form R?
B/c only quantity chemicals required only permit and reclone permit.

The City authorized a temporary permit for wastewater discharge in 1988.

The City of Indianapolis also authorized an air permit for:
1) 4 Belt Sanders/buffer
2) Superior Boiler
3) Power Master Boiler

SPILL INFORMATION

(1) 1987 state (IDEM) Inspection indicated leaky drums in former outdoor drum storage area. CMW has linked contamination to former owners, correct? Yes. In negotiations with P.R. Mallory currently regarding this. An old employee of P.R. Mallory has alleged dumping occurred frequently. Apparently - drums of oil & gas were dumped when a shortage of drums became a problem.

(2) March 1992 - Waste cadmium cyanide solution spilled and reported by CMW. A drum rolled off a skid and fell 6' (~3-5 gal. spilled). Emergency clean up was conducted immediately. Floor sweeps, shovels, boots, and other protective gear was placed in drums and still are being stored at the facility.

Any other known spills? no.

RECEPTORS

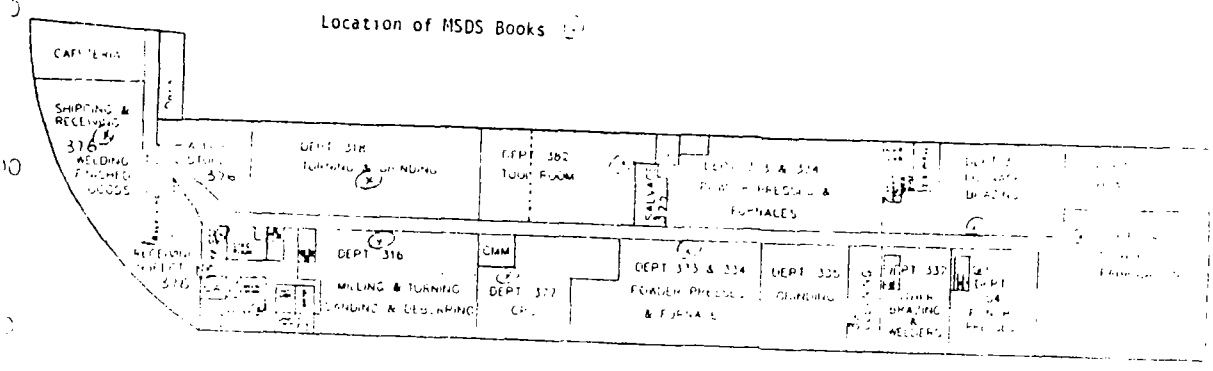
Is there an on-site well for drinking purposes? No. CMW did operate an industrial well for furnace operation, etc. - six months ago. Currently (and for past 6 mo.) facility water is obtained from the city.

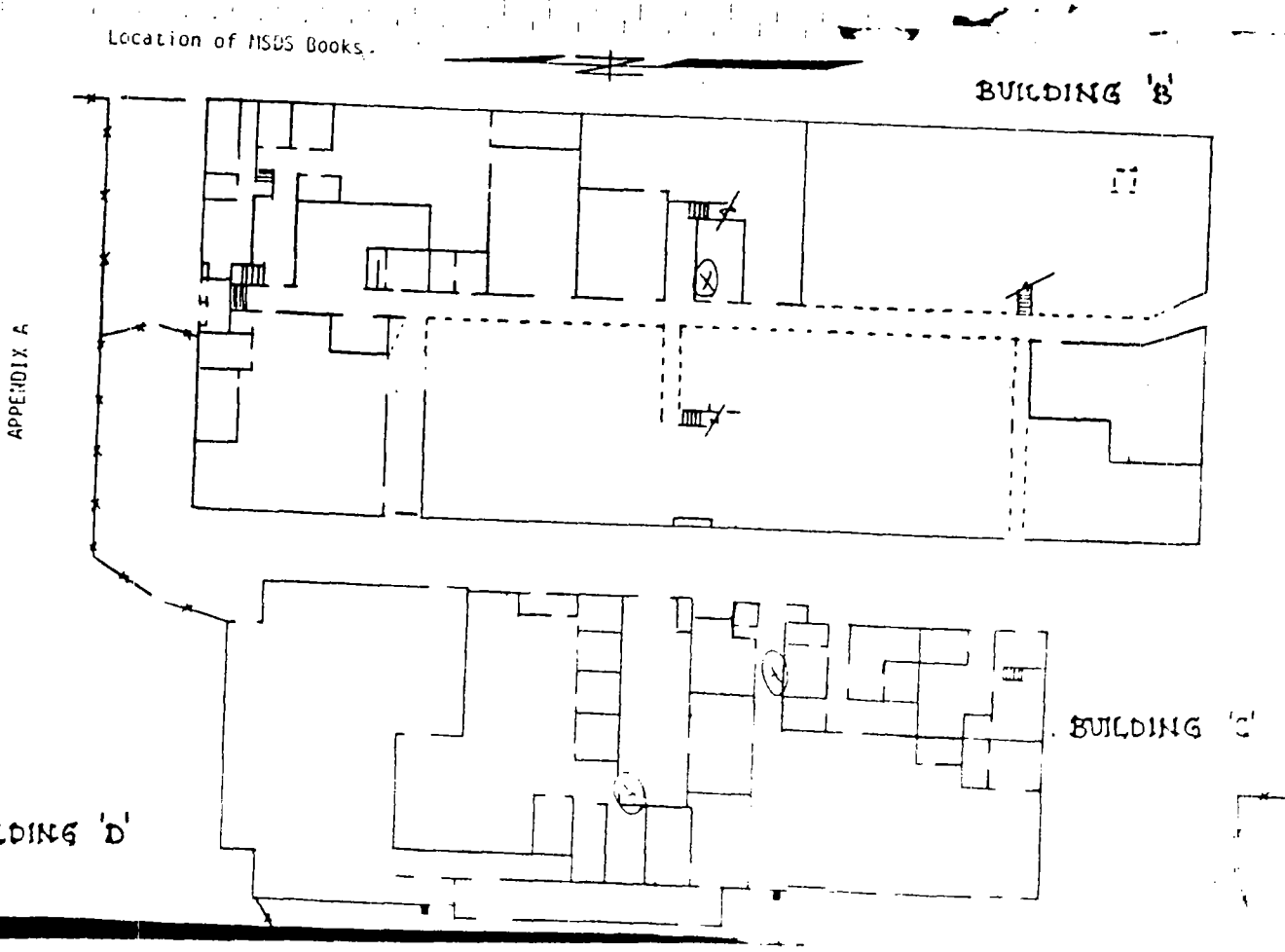
Have any nearby wells ever been tested? Not known

APPENDIX A

BUILDING 'A'

Location of MSDS Books





APPENDIX A

Building A - ~~B~~ various metals shaped and produced from different powder mixes & some virgin ores.
Major machinery here -
- furnaces
- presses
- cold/hot rolls - small rivets, etc.

Building B
- Cold/hot rolls for larger coils
- mostly copper
- Engineers test area, small ~~did he~~ machinery for them
- n-going empties -

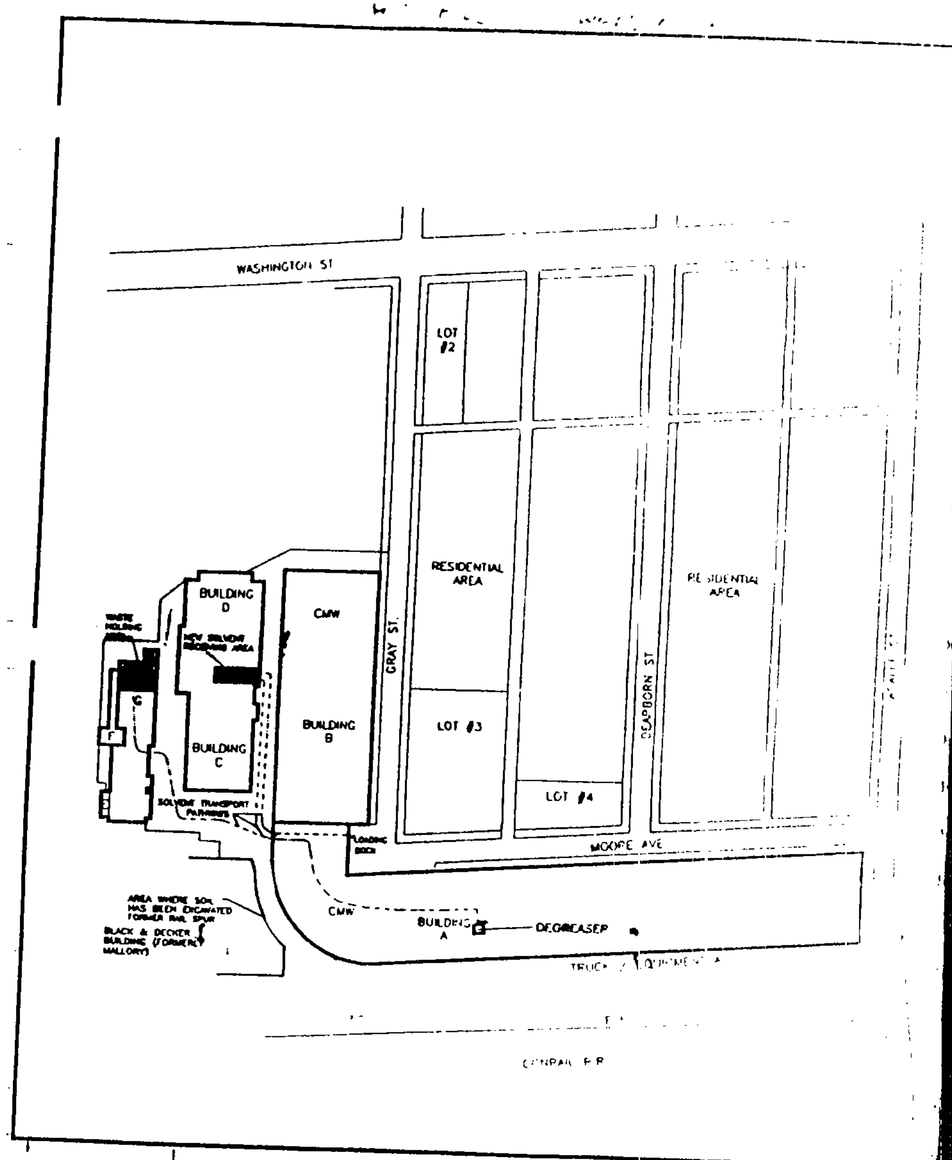
Building C: Graphite molds produced
Maintenance Area
"Barn"
Waste/Product Storage

Building D - Plating Area

Building E: Waste Holding Area - ?
Tools Storage - records

Building F - Old ammonia cracking area
no longer there

Building G - Waste/Product storage



RECEPTORS CONT.

What are the nearby surface waterbodies?
1.- Pleasant Run Creek
2. White River

What direction does runoff flow?
South.

Air flow in plant runs West to East

Where does storm water flow into?
Sewer system which goes thru the Dept. of Public Works. (Belmont Station)

Is the facility fenced?
between CAIW & P.R. Mallory @ NW corner and on the backside by the Railroad tracks.

Other security?
yes - 24 hour ~~s~~ surveillance including a guard post & ~~four~~/five cameras.

Sanitary sewage & storm sewage combined.

An automatic shut-off feature is installed in the outdoor tanks w/ hydrogen, oxygen & nitrogen.

Any reports of hazardous odors by nearby workers or residents?
yes, a complaint by employee working the degreaser. Degreaser was moved - air was tested by OSHA - no contaminants detected.

Random Air testing conducted by OSHA in plant. (i.e. - every 3 years)

Cad levels below the limit - In 1993 - air standards will change making CAIW 1 ug/kg over the allowable limit.

General Notes

In terms of dollar values — approximately 50% of product from powdered ~~products~~ and 50% of product from ores.

The welding product line is growing. Made from copper alloy which contains an interior dispersion strengthener & cools easily.

The cold former is used for copper product formation only. Can run up to 2,000 parts/hour.

The degreaser contains a catch basin or drum of condensate containing 1,1,1-trichloroethane.

The Rotoclone ~~perm~~ began operating in 1988-9.
The Rotoclone is a water scrubber, used during furnace induction. It is a single shift operation in silver casting.

The Rotoclone sucks the furnace air to capture cadmium & silver. Purpose of rotoclone is to keep cadmium exhaust minimal.

The water in the Rotoclone is cleaned yearly. The water is drummed, tested & sent out for proper disposal.

The engineered standard for the Rotoclone is 1700 troy oz./hr.

It is run 1 or 2x/week & is a 1 shift operation (11,050 troy oz./shift) 8 melts/shift.

Fluidized Bed: (Also called the Salt bath) used to clean silver, copper, steel ~~[illegible]~~ using a graphite solution which also acts as a softener.
The graphite is bought in 300 pd. drums. A 5 gallon bucket is replaced every 2 months. There is no waste residue.

Also called an enecker(?) (softener) →

makes work preparation easier.
considered a heat treatment.
Dimensions:
5' x 3' x 22 inches (depth)

Parts are descended via a hoist. (whole wire wheel)
Has an exhaust system.

Plating Shop:

Plating of silver, cadmium, nickel, copper and gold.
Contains a testing & development area & regular plating room.

The plating process consists of
1. clean (using a variety of solvents - ie/ 1,1,1 or HCL/pers. sulf. acid)
2. rinse (sometimes 2)
3. acid pickle rinse
4. plating solution (ie/ cd cy)
5. rinse
6. dry (spundry or steam heated)

Sometimes whole process repeated

Electrowinner (machine)
- A plating process used to reclaim metals. (<10ppm silver released to stream)
- via a spinning action.
- Solvent solution (cyanide silver) ~~heat~~ solidifies metal on a sheet.

- Fresh cleaning solution administered every 4 years or so.

---

other notes:

SW flows into Moore & Gray Sts during heavy rains.

Catch drains and channels in plating shop empty to sewer. 8
4 test points — 3 catch basins.
3 points tested daily by CMW (grab samples)
4th tested by city.

~~water~~ Testing results take 1 week
in meantime water released.
There is in-house testing behind nurse station

CMW alleges that city water is above levels prior to storm

using it.

My concerns —

(1) integrity of floors throughout
2 integrity of building
very old — leaks occurring everywhere from rain.

(2) Drums Storage —
Some drums not in great condition.

Gary said new 55 gallon heavy plastic drums bought in 3/92.
They did a drum inventory after spill incident to make sure all haz. wastes stored in good — strong drums.
The spilled drum allegedly was in good condition.

(3) Labels — not all drums labelled he said — only those empty ones. I might have mixed up bk both wastes/products & empties in same place.

(4) Walls, waves of building
- floors — especially in plating room.
- bad condition — deteriorating.
- Gary said Plating Room
- plans for restructuring —
- pending outcome of water
- treatment system.

City & CMW currently in disagreement over the classification. The city does not recognize them as a plating facility. Therefore the standards for water discharge are stricter.

OBSERVATIONS

Housekeeping practices in the various buildings seemed good. The floors are concrete and due to the age of the building, they were often cracked in appearance. I also noticed powder mixes on the floor in various places — which supposedly is reclaimed and used.

→

The rain was seeping through the building in various places but mostly in the elbow. (of the L shaped bldg.). There was oil residue from presumably cutting fluid in the shaping of parts.

A fan was blowing by the degreaser - 1,1,1 - trichloroethane could have been blown on nearby worker. (He put fan on & - and was told to turn off)

Building B housed a test area for CMW engineers. In this test area was a drum or 2 of ferrous powders.

The degreaser had a catch trays but no other containment

I did not see containment features in the other Cleaning Dept.

The Drum Storage locations (2) both had product + wastes They did not contain any secondary containment features. A few of the drums seemed unsound, were cracked, or dented. All drums were on skids.

Outdoor Waste Piles (2)
1 Pile contained concrete the other soil from the former d.s. area. The only covering is plastic, contaminated soils still remain beneath the building - were not excavated b/c threat of undermining building. Groundwater at 30 feet below the land surface. CMW still waiting to hear from State classification of waste piles.

Plating Shop

Floors were covered w/ wooden pallets. Beneath plats, spills →

were visible from dipping process. No secondary containment. Floor drains capture solvents and are connected to the sewer system. The floor looked eroded, the concrete was eaten away in some places.

Very sloppy operation. Big tanks of solutions all over room. Many were no longer being used but still full of haz. wastes - covered with plastic.

Water collected in drive-in area - appeared to be entering bldg on north & exiting through wall on the south side.

water collected also in test room.
I noticed precipitate of some sort on one of the tanks white - silver probably -

Cadmium cyanide solution still sitting in tanks & drums until a permit is granted for discharge to a sanitary sewer.

Ventilation in the room not great - 2 Fans on south wall.

Odor detected but not sure what it was.

Tanks out-of-service contain
① Silver cyanide solution ~600 gal.

② Nickel strike ~100 gal left
"Woods" - Commercial name

Fresh cleaning solution is replaced every four years or so. Big tanks on east wall haven't been changed ~10 yrs.

Old cadmium still tank out of service - was drained & emptied (used to reduce cadmium discharges)

Drum area in Plating room used to store waste/acid
9. clean solvent solutions -
ie/ sodium phosphate
was 1-55 gal. & 1-15 gal.
at time of inspection

There was more solvent storage in 3rd building - for east room - Muriatic acid
Stored for furnace - cleaner

Health & Safety Programs

1. Silver fabrication Area "Silver Room" -
Casting unit - coveralls daily
APR worn when operating the machine

2. Cleaning Room - Mixing or weighing powders. Double cartridge APR worn when for organics & particulates.

3. Salvage Area -
½ masks worn while separating materials

4. Plating Area -
For manual labor only
boots, glasses required
gloves, apron - if adding to tanks
No respirator required. During my visit - nickel plater did not have glasses, gloves or boots on

5. Ammonia cartridge worn 1x year while dumping latex

6. Graphite Room -
transite is almost used up - still doing 1x mo. or less.
Used as a fixture holder - rectangular w/ cups on it has asbestos fibers -
Worker wears respirator when working with this.

Medical Program

Began in 1980 - yearly check-ups for workers at →

the Methodist Occup. Health Center.

includes: a respirator physical

Employees are FIT tested and monthly exposure log sheets are kept.

PHOTOGRAPHS

FIRST ROLL:

#1 : Shavings, scrap -
Direction: W
Facing (DF)
Time: 1:05 pm

#2 : KITAKO - Lathe
DF: W
Time: 1:05 pm

#3 : Degreaser
DF: SE
Time: 1:07 pm

#4 : Degreaser
DF: E
Time: 1:09 pm

#5 : Still bottoms from degreaser
DF: E
Time: 1:09 pm

#6 : Cast (for copper)
DF: S
Time: 1:11 pm

#7: Powder MIX - contains 1,1,1
DF: West
Time: 1:15 pm

#8: Tungsten Powder sifter
DF: South
Time: 1:15 pm

#9: Powder Press
DF:
Time: 1:17 pm

#10: Sinter Machine
DF: S
Time: 1:20 pm

#11: Isostatic Press
DF: NE
Time: 1:23 pm

#12: Latex Baths w/ compounds
DF: SE
Time: 1:24 pm

#13: ~~Fluidized Bed~~ (Ball Baths)
DF: W
Time: 1:30 pm

#14: Degreaser
DF: E
Time: 1:30 pm

#15: ACID RINSE
DF: S
Time: 1:31 pm

#16: GRINDER
DF: W
Time: 1:32 pm

#17: Silver billett (in a safe)
DF: S
Time: 1:40 pm

#18: Cast
DF: E
Time: 1:42 pm

#19: Cast Unit
DF: E
Time: 1:43 pm

#20: Fluid. Bed (?)
DF: S
Time: 1:35 pm

#21 : Header - makes rivets
DF : N
Time : 1:40 pm

#22 : Extrusion Unit - Large presses
DF : E
Time : 1:45 pm

#23 : Used Oil / Recycled
DF : SE
Time : 1:46 pm

#24 : Salvage Area
DF : N
Time : 1:50 pm

#25 : Test Area
DF : NE
Time : 2:10 pm

2nd Roll

#1 : Storage Room - empties of muriatic acid
DF : SW
Time : 2:15 pm

#2 : Pick-up area for scrap, on right (muriatic recovery orange drum)
DF : SW
Time : 2:17 pm

#3 : Trimsoll Recov. System
DF : W
Time : 2:18 pm

#4 : Machine Oil
DF : W
Time : 2:20 pm

#5 - Scrap
DF : S
Time : 2:21 pm

#6 : Powder Scrap - blk drums
DF : S
Time : 2:21 pm

Picture did not develop

#7: Degreaser Vapor in drums
DF: W
Time: 2:22 pm

#8: Boiler (Backup on right)
DF: SE
Time: 2:30 pm
empties of muriatic acid

2nd storage area ↓↓
#9: Trimsell Storage
DF: S
Time: 2:31 pm

#10: Oil Separator
DF: W
Time: 2:31 pm

#11: Used oil
DF: SE
Time: 2:32 pm

#12: Cd/Cy Solution
DF: S
Time: 2:33 pm

#13: Rotoclone water Residue
DF: N
Time: 2:33 pm

#14: PUFSE (leaking top filter)
DF: NW
Time: 2:34 pm

#15: Latex - non-haz
DF: N
Time: 2:35 pm

#16: Hydrochloric acid - product storage - next to latex -
DF: N
Time: 2:35 pm

#17: Graphite Room
DF: W
Time: 2:40 pm

#18: Transite - white sheet
DF: N
Time: 2:41 pm

#19: Stockpiled Soils
note - flooding
DF: E
Time: 2:45 pm

#20: 2nd pile - Soil
DF: S
Time: 2:45 pm

#21: old D.S. trench
DF: W
Time: 2:46 pm

#22: Bio-waste (~35 pds/yr)
DF: SE
Time: 3:20 pm

#23: Degreaser / cleaner
DF: S
Time: 3:30 pm

#24: stripping solutions
DF: N
Time: 3:33 pm

#25: Nickel plating Baths
DF: N
Time: 3:34 pm

#26: All metals assembly
DF: W
Time: 3:36 pm

#27: Silver Clean Tanks
DF: N
Time: 3:37 pm

3rd Roll:

#1: Plating Room #1
DF: NE
Time: 8:03 am

#2: PR #2 tanks on east wall
DF: NE
Time: 8:07 am

#3: PR #2 - close up tank ~320 gal (small ~165 gal tank
DF: NE
Time: 8:09 am

#4: Dipping Hoist
DF: N
Time: 8:10 am

#5: Electrowinner - Plate w/ silver on it
DF: W
Time: 8:15 am

#6: Genrl. drum s. of aq solutions
DF: NE
Time: 8:16 am

#7: Drums of clean. solution
DF: South
Time 8:16 am

#8 Drive in - Floor area
Time: 8:17 am
DF: S

#9: Spinner - electrowinner
Time 8:17 am
DF SW

#10: Copper pieces to be nicked plated
DF: ~~SE~~
Time: 8:19 am

#11: Covered tanks - out of service 3/4 full - silver strike & drag out
DF: ~~SE~~
Time 8:20 am

#12: General Photo of Shop
DF: E
Time 8:21 am

#13: Floor Drain - Close-up
DF: W
Time: 8:22 am

#14: Solution tanks
DF: E
Time: 8:23 am

#15: Water tank/tumbler/dryer
DF: E
Time: 8:24 am

#16: Final silver cleaning (draining) tank (ammon. persulfate)
DF: N
Time: 8:26 am

#17: Silver Clean. Solutions
DF S
Time: 8:27 am

#18: Floor Boards
DF: W
Time: 8:30 am

#19: Alley bet. bldgs - sign of plating Shop
DF: SW
Time: 8:32 am

#20: Graphite Room - outer Photo
DF: SW
Time: 8:34 am

#21: Old soil removal area
DF: ~~SE~~
Time: 8:35 am

#22: Soil - Stock Pile
DF: East
Time: 8:36 am
(3 tanks in background of gases - hyd, oxygen, nitrogen)

#23: Drum Storage Warehse.
DF: East
Time: 8:40 am

#24: Outside of Facility
DF: SW
Time: 10:50 am

APPENDIX C

LABORATORY ANALYSES OF SOILS FROM FORMER DRUM STORAGE AREA

ATEC Environmental Consultants
Division of ATEC Associates, Inc.
5150 East 65th Street
Indianapolis, Indiana 46220-4871
(317) 849-4990, FAX # (317) 849-4278

June 10, 1988

Mr. Nicholas Hale
CMW, Inc.
70 South Gray Street
P.O. Box 2266
Indianapolis, Indiana 46206

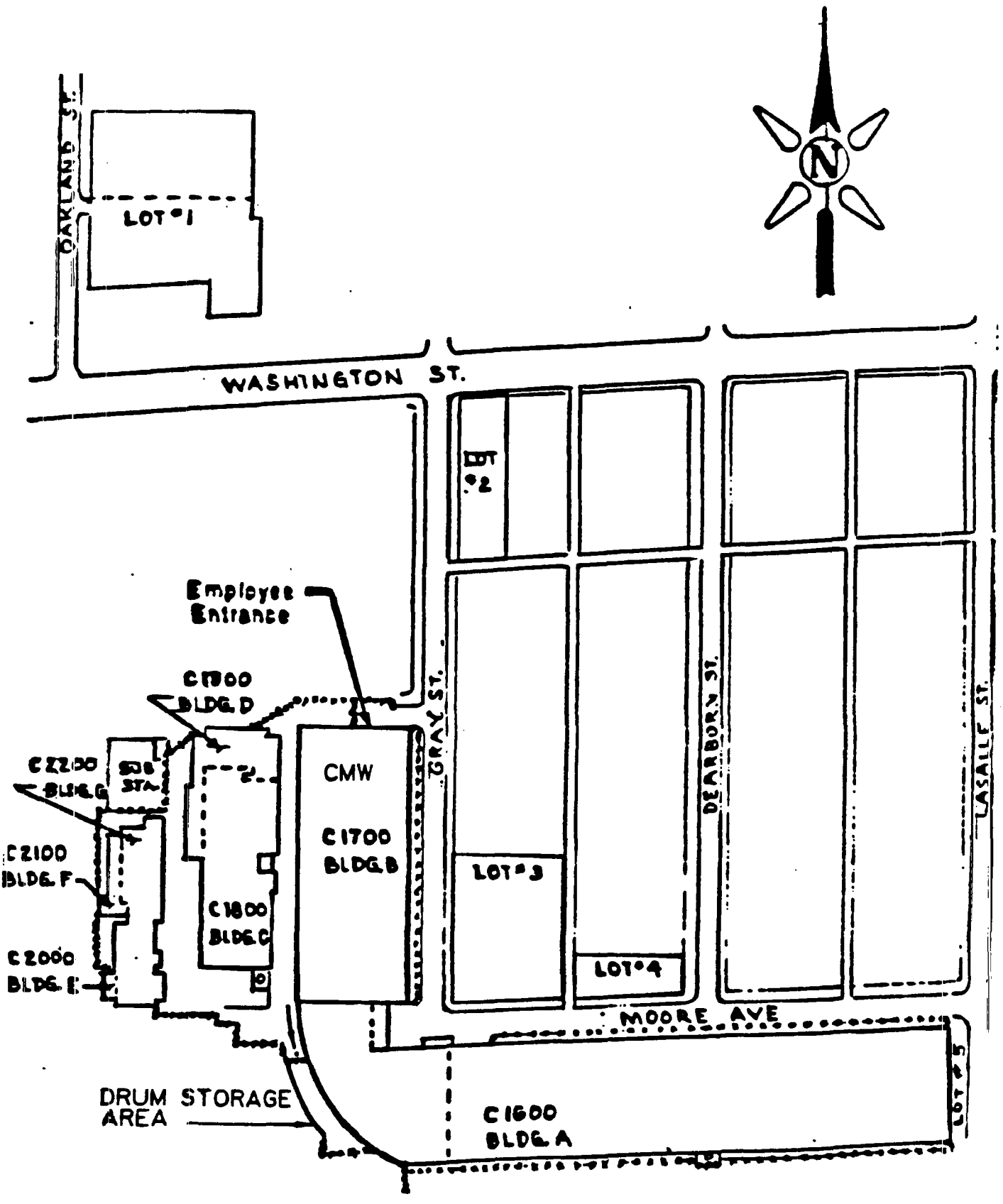
Re: Sampling and Analysis Report
CMW, Inc. Drum Storage Area
Indianapolis, Indiana
ATEC Project Number 21-87176

Dear Mr. Hale:

Pursuant to our ATEC Proposal Number PE-88151 dated May 4, 1988 regarding additional sampling and analyses from the CMW, Inc. Drum Storage Area, ATEC Environmental Consultants (ATEC) herewith submits the results of our laboratory analyses from samples collected.

INTRODUCTION

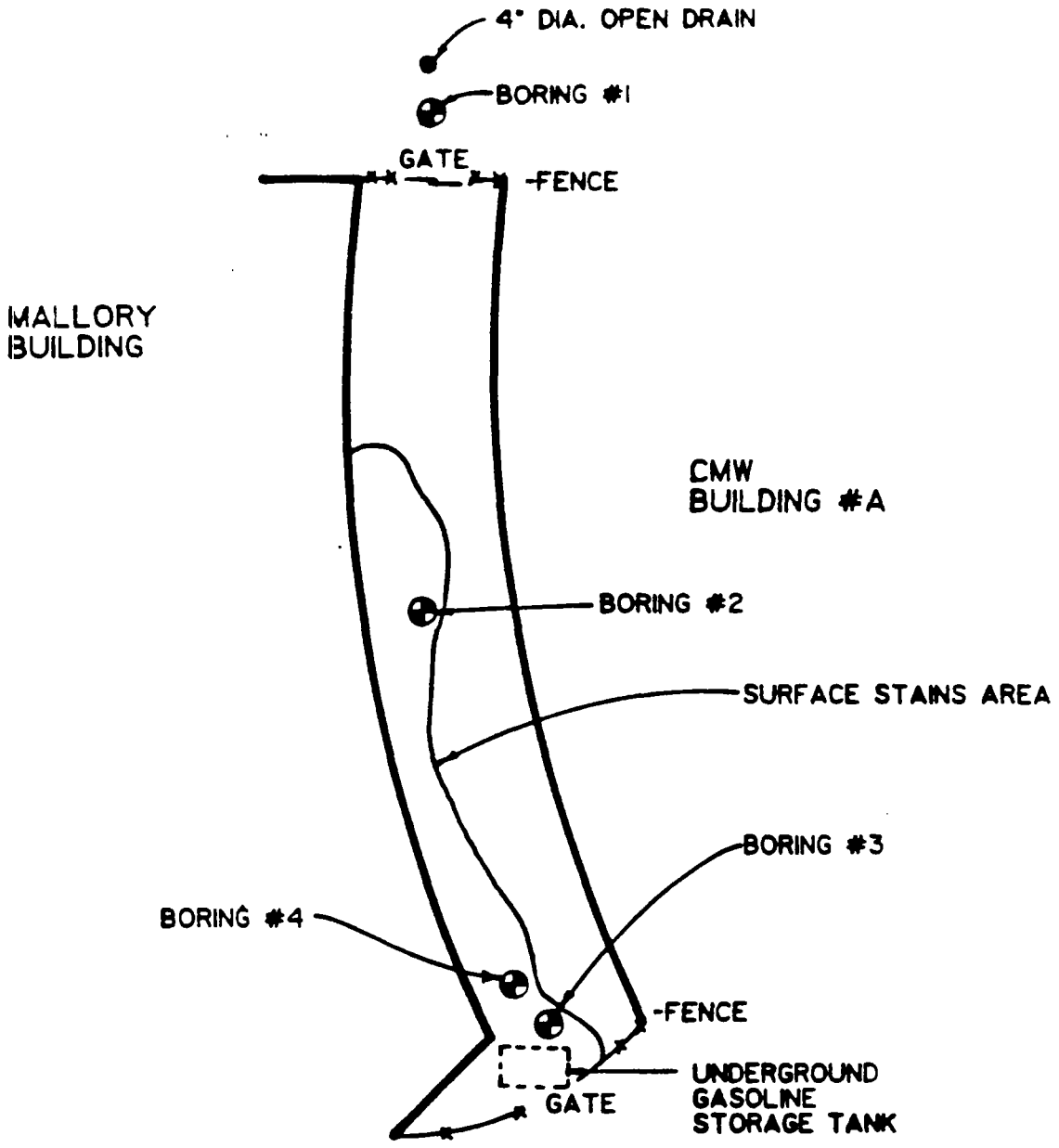
ATEC analyzed soil samples from BH-2 (Location) shown in Figure 1 for total cadmium concentration. We also collected soil samples from a new boring identified as BH-4 location as shown in Figure land 2). Samples in this boring were collected at 6 in., 12 in and 18 in. depths and were analyzed for volatile organic compounds (VOCs). All work was performed in accordance with IDEM and U.S. EPA guidelines regarding QA/QC sampling and analyses procedures. Analytical results from the work done is reported for total cadmium concentration in boring BH-2 in Table 1. These cadmium levels appear to be at acceptable concentrations with the full analytical results found in Attachment A.



PROJECT SITE
CMW, INC.
DRUM STORAGE AREA
INDIANAPOLIS, IN

PROJECT NO.	21-87176
SCALE	NONE
FIGURE NO.	1

ATEC



SAMPLE BORINGS
CMW, INC.
INDIANAPOLIS, IN

PROJECT NO.	21-87176
SCALE	1" ~ 25'
FIGURE NO.	2

ATEC

Table 1
Total Cadmium Concentration

Borehole BH-2

Sample	Sample Depth, (in.)	Total Cadmium Concentration (ppm)
BH-2-B	12	0.80
BH-2-C	18	0.40
BH-2-D	24	0.50
BH-2-E	30	0.70
BH-2-F	36	0.50

Analytical results for VOCs are reported for boring BH-4 as follows:

Table 2

Detected Volatile Organic Compounds

Borehole BH-4

Sample	Sample Depth (in.)	Volatile Organic Compound	Total Concentration (ppm)
BH-4-A	6	trichloroethylene	0.096
		tetrachlorethylene	0.039
BH-4-B	12	1,1-dichloroethylene	0.180
		1,1-dichloroethane	0.260
		trans-1,2-dichloroethylene	4.9
		chloroform	0.630
		1,1,1-trichloroethane	5
		trichloroethylene	48
		tetrachloroethylene	2.2
BH-4	18	Acetone	0.20
		1,1-dichloroethylene	0.75
		1,1-dichloroethane	0.59
		trans-1,2-dichloroethylene	1.30
		chloroform	0.071
		1,1,1-trichloroethane	0.51
		trichloroethylene	2.40
		tetrachlorethylene	0.25

EVALUATION CRITERIA LIMITS

Since there are no universally accepted clean-up standards relating to concentrations of VOCs in soils, the various methods by which the IDEM has approved decontamination in the past have been revised. However, our experience with the IDEM enforcement procedures involving remedial action has shown that soils with concentrations of 1 ppm or greater chlorinated solvents were required to be cleaned up. Since the levels of chlorinated solvents found in BH-4 exceed 1 ppm, ATEC is recommending remediation of the site to remove these contaminated soils. However, prior to contaminated soil removal from this site, additional sampling and analysis is recommended to define the horizontal and vertical extent of VOC contamination.

The standard which ATEC believes to be most representative of acceptable clean-up levels involves the use of the limits established by the "Toxicity Characteristic Leaching Procedure" (TCLP). The limits for certain contaminants as proposed in the U.S. EPA modification to 40 CFR Part 261, found in the June 13, 1986 Federal Register is found in Table 3 as follows:

Table 3

TCLP Limits for Contaminants

Detected in the CMW, Inc. Drum Storage Area

Contaminant	TCLP Limit (ppm)
1,1-dichloroethylene	0.10
1,1-dichloroethane	0.40
chloroform	0.07
1,1,1-trichloroethane	30
trichloroethylene	0.07
tetrachlorethylene	0.10

CONCLUSIONS AND RECOMMENDATIONS

A comparison of analytical results with the TCLP limits indicates that certain contaminants were detected above the TCLP limits.

It is recommended that those areas showing contaminant levels above the established criteria limits for this project be removed offsite, transported and properly disposed of according to all U.S. EPA and IDEM approved procedures.

The TCLP procedure involves measuring a contaminant concentration following an extraction procedure similar to that used for

EP-toxicity testing which is designed to simulate leaching of a contaminant from the waste following disposal. Although the VOC measurements provided during this investigation are total concentrations rather than TCLP concentrations (i.e., leachable conentrations), it is believed that if total concentrations are below the TCLP concentrations, then these levels would not represent a threat to human health or the environment. However, analytical results show total concentrations to be greater than the proposed TCLP levels, therefore ATEC recommends remediation of the contaminated materials. Appropriate arrangements will need to be made for the hauling of the waste material by an IDEM licensed hazardous waste transporter and to obtain approval for disposal of the waste material from a fully licensed hazardous waste landfill disposal facility in the State of Indiana. Clean landfill material will then be used to fill in the areas which have been excavated after determining that all contaminated soils have been properly removed. A complete proposal outlining all work to be performed during this project will be forwarded to you after receipt of this report.

Please feel free to contact us if you have any questions or comments.

Very truly yours,

ATEC Associates, Inc.

Noel L. Daniel
Staff Geologist, C.P.G.

Matthew C. Stokes, C.H.M.M.
Project Environmental Scientist

ATTACHMENT A

June 7, 1988

Mr. Noel Daniel
ATEC Environmental Consultants
5150 East 65th Street
Indianapolis, IN 46220

Re: Three Soil VOA; SW 846 Method 8240
Five Soil Cadmium; SW 846 Method 7130
CMW, Inc.
ATEC Project Number 21-87176

Dear Mr. Daniel:

Enclosed are the results of the Organic Analyses for the eight soil samples which were submitted to the ATEC Environmental/Analytical Testing Division on May 18, 1988, on behalf of CMW, Inc. The volatile samples were analyzed on a Finnigan Incos 50 GC/MS/DS system, complete with Superincos Software, via SW 846 Method 8240 for Purgeable Organic Compounds. Prior to analysis the system was tuned against Bromofluorobenzene and calibrated with the appropriate standard. Cadmium was analyzed on a Varian SpectrAA-10 Atomic Absorption Spectrophotometer according to Method 7310 as outlined in SW 846.

All associated Quality Control information will be maintained in the Testing Division files, a copy of which can be forwarded to you upon request. After a thirty-day period, a fee will be assessed for this additional information.

Samples will be held for a period of thirty days following the date of this report, after which re-analysis will require the submission of fresh samples. It has been a pleasure serving you and, as always, if there are any questions concerning these results or the ATEC Policies, please feel free to contact me.

Respectfully submitted,

ATEC Associates, Inc.

Keith S. Kline

Keith S. Kline
Environmental/Analytical
Testing Division

Client: CMW, Inc.
Client Address: 70 South Gray Street
P.O. Box 2266
Indianapolis, IN 46201

Client Sample Identification: BH4-A
Sample Matrix: Soil
Date Sample Collected: May 18, 1988
Date Sample Received: May 18, 1988
Date Sample Analyzed: May 31, 1988

VOLATILE COMPOUNDS ANALYTICAL RESULTS

ATEC Lab No. 81220A

Analyte	CAS Number	Concentration (ug/kg)	Quantitation Limit (ug/kg)
Chloromethane	74-87-3	<10	10
Bromomethane	74-83-9	<10	10
Vinyl Chloride	75-01-4	<10	10
Chloroethane	75-00-3	<10	10
Methylene Chloride	75-09-2	< 5*	5
Acetone	67-64-1	<50*	50
Carbon Disulfide	75-15-0	< 5	5
1,1-Dichloroethene	75-35-4	< 5	5
1,1 Dichloroethane	75-35-3	< 5	5
Trans-1,2-Dichloroethene	156-60-5	< 5*	5
Chloroform	67-66-3	< 5*	5
1,2-Dichloroethane	107-06-2	< 5	5
2-Butanone	78-93-3	<50*	50
1,1,1-Trichloroethane	71-55-6	< 5*	5
Carbon Tetrachloride	56-23-5	< 5	5
Vinyl Acetate	108-05-4	<10	10
Bromodichloromethane	75-27-4	< 5	5
1,2-Dichloropropane	78-87-5	< 5	5

* Analyte detected but amount present is less than the quantitation Limit.

ANALYTICAL RESULTS

ATEC Lab No. 81220A

Analyte	CAS Number	Concentration (ug/kg)	Quantitation Limit (ug/kg)
Trans-1, 3-Dichloropropene	10061-02-6	< 5	5
Trichloroethene	79-01-6	96	5
Dibromochloromethane	124-48-1	< 5	5
1,1,2-Trichloroethane	79-00-5	< 5	5
Benzene	71-43-2	< 5	5
cis-1,3-Dichloropropene	10061-01-5	< 5	5
2-Chloroethylvinylether	110-75-8	<10	10
Bromoform	75-25-2	< 5	5
4-Methyl-2-Pentanone	591-78-6	<10	10
2-Hexanone	108-10-1	<10	10
Tetrachloroethene	127-18-4	39	5
1,1,2,2-Tetrachloroethane	79-34-5	< 5	5
Toluene	108-88-3	< 5*	5
Chlorobenzene	108-90-7	< 5	5
Ethylbenzene	100-41-4	< 5	5
Styrene	100-42-5	< 5	5
Total Xylenes		< 5	5

* Analyte detected but amount present is less than the Quantitation Limit.

Analytical Method: SW 846 Method 8240

Analyst: J. Sima
Verified: K. Kline
Date Reported: June 6, 1988

Respectfully submitted,

Keith S. Kline

Environmental/Analytical Testing Division

Client: CMW, Inc.
Client Address: 70 South Gray Street
P.O. Box 2266
Indianapolis, IN 46201

Client Sample Identification: BH4-B
Sample Matrix: Soil
Date Sample Collected: May 18, 1988
Date Sample Received: May 18, 1988
Date Sample Analyzed: May 31, 1988

VOLATILE COMPOUNDS
ANALYTICAL RESULTS

ATEC Lab No. 81220B

Analyte	CAS Number	Concentration (ug/kg)	Quantitation Limit (ug/kg)
Chloromethane	74-87-3	<53	53
Bromomethane	74-83-9	<53	53
Vinyl Chloride	75-01-4	<53	53
Chloroethane	75-00-3	<53	53
Methylene Chloride	75-09-2	<26*	26
Acetone	67-64-1	<260*	260
Carbon Disulfide	75-15-0	<26	26
1,1-Dichloroethene	75-35-4	180	26
1,1 Dichloroethane	75-35-3	260	26
Trans-1,2-Dichloroethene	156-60-5	4900	26
Chloroform	67-66-3	630	26
1,2-Dichloroethane	107-06-2	<26	26
2-Butanone	78-93-3	<260*	260
1,1,1-Trichloroethane	71-55-6	5000	26
Carbon Tetrachloride	56-23-5	<26	26
Vinyl Acetate	108-05-4	<53	53
Bromodichloromethane	75-27-4	<26	26
1,2-Dichloropropane	78-87-5	<26	26

* Analyte detected but amount present is less than the quantitation Limit.

ANALYTICAL RESULTS

ATEC Lab No. 81220B

Analyte	CAS Number	Concentration (ug/kg)	Quantitation Limit (ug/kg)
Trans-1, 3-Dichloropropene	10061-02-6	<26	26
Trichloroethene	79-01-6	48,000	26
Dibromochloromethane	124-48-1	<26	26
1,1,2-Trichloroethane	79-00-5	<26	26
Benzene	71-43-2	<26*	26
cis-1,3-Dichloropropene	10061-01-5	<26	26
2-Chloroethylvinylether	110-75-8	<53	53
Bromoform	75-25-2	<26	26
4-Methyl-2-Pentanone	591-78-6	<53	53
2-Hexanone	108-10-1	<53	53
Tetrachloroethene	127-18-4	2200	26
1,1,2,2-Tetrachloroethane	79-34-5	<26	26
Toluene	108-88-3	<26	26
Chlorobenzene	108-90-7	<26	26
Ethylbenzene	100-41-4	<26	26
Styrene	100-42-5	<26	26
Total Xylenes		<26	26

* Analyte detected but amount present is less than the Quantitation Limit.

Analytical Method: SW 846 Method 8240

Analyst: J. Sima
Verified: K. Kline
Date Reported: June 6, 1988

Respectfully submitted,

Keith S. Kline

Environmental/Analytical Testing Division

Client: CMW, Inc.
Client Address: 70 South Gray Street
P.O. Box 2266
Indianapolis, IN 46201

Client Sample Identification: BH4-C
Sample Matrix: Soil
Date Sample Collected: May 18, 1988
Date Sample Received: May 18, 1988
Date Sample Analyzed: May 31, 1988

VOLATILE COMPOUNDS
ANALYTICAL RESULTS

ATEC Lab No. 81220C

Analyte	CAS Number	Concentration (ug/kg)	Quantitation Limit (ug/kg)
Chloromethane	74-87-3	<37	37
Bromomethane	74-83-9	<37	37
Vinyl Chloride	75-01-4	<37	37
Chloroethane	75-00-3	<37	37
Methylene Chloride	75-09-2	<19*	19
Acetone	67-64-1	200	190
Carbon Disulfide	75-15-0	<19	19
1,1-Dichloroethene	75-35-4	75	19
1,1 Dichloroethane	75-35-3	59	19
Trans-1,2-Dichloroethene	156-60-5	1300	19
Chloroform	67-66-3	71	19
1,2-Dichloroethane	107-06-2	<19	19
2-Butanone	78-93-3	<190*	190
1,1,1-Trichloroethane	71-55-6	510	19
Carbon Tetrachloride	56-23-5	<19	19
Vinyl Acetate	108-05-4	<37	37
Bromodichloromethane	75-27-4	<19	19
1,2-Dichloropropane	78-87-5	<19	19

* Analyte detected but amount present is less than the quantitation Limit.

ANALYTICAL RESULTS

ATEC Lab No. 82110C

Analyte	CAS Number	Concentration (ug/kg)	Quantitation Limit (ug/kg)
Trans-1, 3-Dichloropropene	10061-02-6	<19	19
Trichloroethene	79-01-6	2400	19
Dibromochloromethane	124-48-1	<19	19
1,1,2-Trichloroethane	79-00-5	<19	19
Benzene	71-43-2	<19*	19
cis-1,3-Dichloropropene	10061-01-5	<19	19
2-Chloroethylvinylether	110-75-8	<37	37
Bromoform	75-25-2	<19	19
4-Methyl-2-Pentanone	591-78-6	<37*	37
2-Hexanone	108-10-1	<37	37
Tetrachloroethene	127-18-4	250	19
1,1,2,2-Tetrachloroethane	79-34-5	<19	19
Toluene	108-88-3	<19	19
Chlorobenzene	108-90-7	<19	19
Ethylbenzene	100-41-4	<19	19
Styrene	100-42-5	<19	19
Total Xylenes		<19	19

* Analyte detected but amount present is less than the Quantitation Limit.

Analytical Method: SW 846 Method 8240

Analyst: J. Sima
Verified: K. Kline
Date Reported: June 6, 1988

Respectfully submitted,

Keith S. Kline

Environmental/Analytical Testing Division

REPORT OF TEST RESULTS

ATEC Project Number 21-87176

DATE: June 7, 1988

CLIENT: CMW, Inc.
70 South Gray Street
P.O. Box 2266
Indianapolis, IN 46201

SAMPLE IDENTIFICATION: Cadmium Analysis
SAMPLE MATRIX: Soil
SAMPLE TAKEN BY: ATEC (ND)
DATE RECEIVED: May 18, 1988
ANALYST: TO

Parameter (units in mg/kg unless noted)	Sample I.D. Number					MDL*	SW 846 Analytical Method No.
	BH-2B	BH-2C	BH-2D	BH-2E	BH-2F		
Total Metals							
Cadmium	0.8	0.4	0.5	0.7	0.5	0.5	7130

* Method Detection Limit

Respectfully submitted,
ATEC Associates, Inc.

Keith S. Kline

Environmental/Analytical Testing Division

ANALYTICAL RESULTS

ATEC Lab No. 82110C

Analyte	CAS Number	Concentration (ug/kg)	Quantitation Limit (ug/kg)
Trans-1, 3-Dichloropropene	10061-02-6	<19	19
Trichloroethene	79-01-6	2400	19
Dibromochloromethane	124-48-1	<19	19
1,1,2-Trichloroethane	79-00-5	<19	19
Benzene	71-43-2	<19*	19
cis-1,3-Dichloropropene	10061-01-5	<19	19
2-Chloroethylvinylether	110-75-8	<37	37
Bromoform	75-25-2	<19	19
4-Methyl-2-Pentanone	591-78-6	<37*	37
2-Hexanone	108-10-1	<37	37
Tetrachloroethene	127-18-4	250	19
1,1,2,2-Tetrachloroethane	79-34-5	<19	19
Toluene	108-88-3	<19	19
Chlorobenzene	108-90-7	<19	19
Ethylbenzene	100-41-4	<19	19
Styrene	100-42-5	<19	19
Total Xylenes		<19	19

* Analyte detected but amount present is less than the Quantitation Limit.

Analytical Method: SW 846 Method 8240

Analyst: J. Sima
Verified: K. Kline
Date Reported: June 6, 1988

Respectfully submitted,

Keith S. Kline

Environmental/Analytical Testing Division

REPORT OF TEST RESULTS

ATEC Project Number 21-87176

DATE: June 7, 1988

CLIENT: CMW, Inc.
70 South Gray Street
P.O. Box 2266
Indianapolis, IN 46201

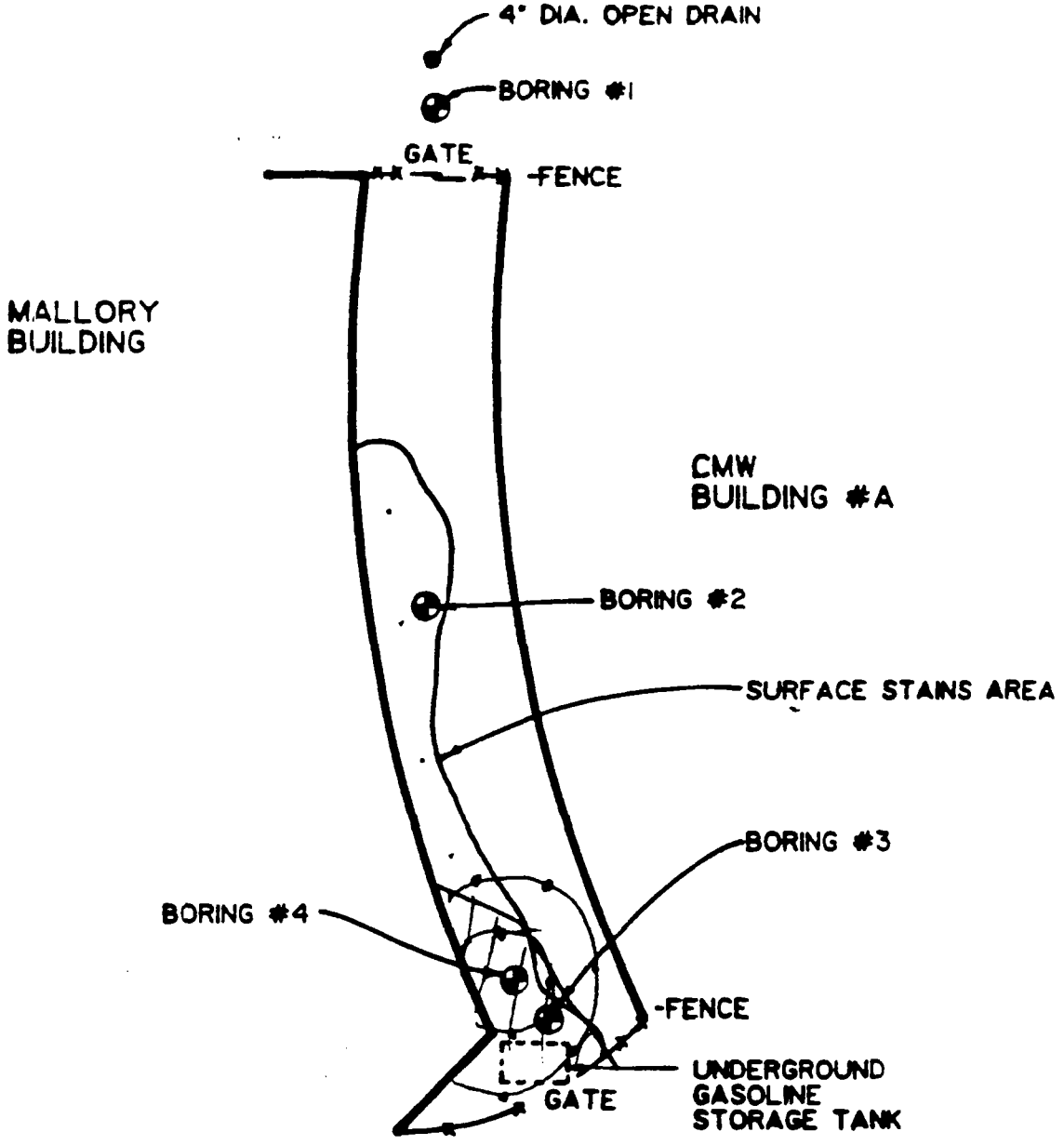
SAMPLE IDENTIFICATION: Cadmium Analysis
SAMPLE MATRIX: Soil
SAMPLE TAKEN BY: ATEC (ND)
DATE RECEIVED: May 18, 1988
ANALYST: TO

Parameter (units in mg/kg unless noted)	Sample I.D. Number						SW 846 Analytical Method No.
	BH-2B	BH-2C	BH-2D	BH-2E	BH-2F	MDL*	
Total Metals							
Cadmium	0.8	0.4	0.5	0.7	0.5	0.5	7130

* Method Detection Limit

Respectfully submitted,
ATEC Associates, Inc.

Keith S. Kline
Environmental/Analytical Testing Division



SAMPLE BORINGS
CMW, INC.
INDIANAPOLIS, IN

PROJECT NO.	21-87176
SCALE	1" ~ 25'
FIGURE NO.	2

ATEC

APPENDIX D

MATERIAL AND SAFETY DATA SHEETS FOR CMW PROCESSES

* SWMU 2

MATERIAL SAFETY DATA SHEET

MacDermid
INCORPORATED
245 FREIGHT ST. • WATERBURY, CT 06702 • (203) 575-5700

2	0	0	Cor
Health	Flammability	Reactivity	Other

PRODUCT Metex M-629

PRODUCT CODE 13001

PRODUCT CODE MUST ACCOMPANY ALL INQUIRIES REGARDING THIS PRODUCT

Issue Date: 08/14/73 Page 1 of 7
Revised Date: 10/05/90 1 9

24 HR. EMERGENCY NUMBER: CHEMTREC (800) 424-9300

SECTION 1 PRODUCT IDENTIFICATION

TRADE NAME: Metex M-629

CHEMICAL FAMILY: INORGANIC SALTS

FORMULA: Proprietary Mixture

HMIS RATING: 2 HEALTH 0 FLAMABILITY 0 REACTIVITY Cor OTHER
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 HAZARDOUS INGREDIENTS

MacDermid Incorporated has identified the following chemical ingredient(s) as hazardous.

INGREDIENT(S)	CAS #	BY WEIGHT %
Sodium Bisulfate	7681-38-1	90
Sodium Fluoride	7681-49-4	10

SECTION 3 PHYSICAL DATA

DENSITY: 85 LB/CU.FT
FORM: Solid
SPECIFIC GRAVITY: n/a
pH: n/a
FREEZING POINT: n/a
FLASH POINT: n/a
SOLUBILITY IN WATER: Complete
VAPOR PRESSURE: n/a
COLOR: White to off-white
ODOR: Odorless

NOTE: These physical properties are typical values for this product

SECTION 4 FIRE AND EXPLOSION DATA

FLASH POINT: n/a

EXTINGUISHING MEDIA:
NEVER allow run-off to enter sewers or waterways.
As appropriate for surrounding material
For massive fires use unmanned hose holder or monitor nozzle

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Will form an acid solution on contact with water
Fight fire from remote locations

SECTION 5 FIRST AID DATA

Contact a physician in all cases of exposure. First aiders should provide for their own safety prior to rendering assistance.

EYES:

Wash affected eyes under slowly running water for 15 minutes
If pain persists consult physician

SKIN:

If contacted wash the skin with water for 15 minutes.
Care should be taken not to contaminate healthy skin

INGESTION:

If ingested rinse the mouth and throat liberally with water
Do not induce vomiting; contact physician immediately

INHALATION:

Remove the victim to cool uncontaminated area
Victim should immediately blow his nose to remove substances

CAUTION: If unconscious-having trouble breathing-or in convulsions-do not induce vomiting or give water.

ADDITIONAL INFORMATION:
Always clean contaminated clothing and gear prior to reuse.
NEVER administer anything to an unconscious person.

SECTION 6 HEALTH EFFECTS DATA

Primary Route(s) of Exposure: Eye Skin Inhalation and Ingestion

EYE CONTACT: May cause intensive burning and stinging sensation
Intense watering of eyes will occur
Can cause possible injury to eyes and impairment of vision

SKIN CONTACT: Causes painful sensation to skin
When absorbed through skin may produce fatigue
Profound damage to tissues may occur with prolonged exposure

INGESTION: Irritation and burning sensation of lips/mouth and throat
Difficulty in breathing occurs
Muscular fatigue with general weakness develops

INHALATION: Irritation of mucous membrane of nose/mouth/throat may occur
May result in fatigue
Prolonged exposure may cause trembling of arms and legs

SECTION 7 PERSONAL PROTECTIVE DATA

RESPIRATORY PROTECTION: If the OSHA-PEL/ACGIH-TLV are exceeded, it is recommended that a NIOSH approved respirator be used. Consult with your industrial hygienist for appropriate cartridge selection & use.

For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a pressure-demand, self-contained breathing apparatus is recommended.

VENTILATION: General ventilation is recommended. Additionally, local exhaust ventilation is recommended where vapors, dusts, mists, or aerosols may be released.

PROTECTIVE EQUIPMENT:

Splash proof goggles; Face shields; Chemical aprons; Boots and gloves.

The availability of an eye wash fountain and safety shower is recommended.

If clothing is contaminated, remove clothing and thoroughly wash the affected body area. Launder contaminated clothing before reuse.

Consult with your Safety Professional/Industrial Hygienists for specific information regarding applications at your facility.

SECTION 8 TOXICOLOGY DATA

TOXICITY STUDIES: Toxicity Studies have not been conducted on this product. However, toxicity literature surveys have been conducted on the ingredient(s) in Section 2. The results are as follows:

ACUTE ORAL TOXICITY: Sodium fluoride (Albino Rats): LD50 = 52 mg/kg

ACUTE DERMAL TOXICITY: Sodium fluoride (Mouse): LD50 = 300 mg/kg

ACUTE RESPIRATORY TOXICITY: Unknown

TOXICITY HAZARD REVIEW (THR):
Human systemic effects by ingestion and intradermal routes. Excessive exposure to fluorides may cause ostesclerosis; ossification of ligament; skeletal fluorosis; mottling of dental enamel; kidney dysfunction.

Listed as suspected carcinogen by: IARC: no NTP: no OSHA: no

SECTION 9 REACTIVITY DATA

INCOMPATIBILITY: Strong alkalies; glass; titanium

HAZARD DECOMPOSITION PRODUCTS: Oxides of sulfur and fluorides

STABILITY: Stable

CONDITIONS TO AVOID: Contact with moisture; may liberate sulfuric acid

HAZARDOUS POLYMERIZATION: No

MacDermid Incorporated

245 FREIGHT STREET WATERBURY CT 06702 TELEPHONE (203)575 5[illegible] TELEX 4439[illegible] FAX 203 575 5030

MATERIAL SAFETY DATA SHEET

Product: Metex M-629 Issue Date: 08/14/73

Product Code: 13001 Revised Date: 10/05/90

24 Hour Emergency Number: CHEMTREC (1-800-424-9300)

1 9

SECTION 10 SPILL AND DISPOSAL DATA

In Case of Transportation Accidents, call the following 24 hour telephone number: CHEMTREC (1-800-424-9300)

SPILL CONTROL AND RECOVERY:
NEVER allow spills to enter sewers or waterways. Avoid dusting. Sweep up and collect for disposal in plastic recovery drum. Do not return to orginal container. Flush residue to chemical drain with large quantities of water.

DISPOSAL:
Dispose of by an approved method at an approved secure facility.

Due to more restrictive waste disposal regulations, NEVER waste treat or dispose of material until you check your appropriate local, state, & federal regulations for requirements. Spills may REQUIRE notification to FEDERAL, STATE and/or LOCAL AUTHORITIES.

SECTION 11 TRANSPORTATION DATA

DOT PROPER SHIPPING NAME: Sodium Hydrogen Sulfate Solid Mixture

HAZARD CLASS: ORM-B

UN/NA #: UN1821

IMO/IATA : Sodium Hydrogen Sulphate Solid Mixture

HAZARD CLASS: 8

SECTION 12 GENERAL STORAGE DATA

Material should be stored in the properly sealed original container.

CORROSIVE MATERIALS - Corrosive materials must not be above, below or adjacent to: Flammable Solids, Oxidizing Materials or Cyanide Bearing Materials (Poisons).

ACIDS/ALKALINES- Acid bearing material should be stored separate from alkaline materials.

SECTION 13 REGULATORY DATA

The Following Regulations apply to this product.

FEDERAL REGULATIONS:

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200: Based on our evaluation, the following ingredients in this product are subject to this rule:

CHEMICAL NAME	CAS #	BY WEIGHT %	OSHA-PEL	ACGIH-TLV
Sodium Bisulfate	7681-38-1	90	Not-Listed	Not-Listed
Sodium Fluoride	7681-49-4	10	2.5 mg/m3	2.5 mg/m3

CERCLA/SUPERFUND, 40 CFR 117, 302/304: Notification of spills of this product is required.

CHEMICAL NAME	CAS #	BY WEIGHT %	TPQ	R.Q.
Sodium Fluoride	7681-49-4	10	None	5000 lbs

SARA/SUPERFUND AMENDENTS & REAUTHORIZATION ACT of 1986 (TITLE III)-Sections 302,311,312,& 313:

SECTION 302: Extremely Hazardous Substances (40 CFR 355)
This product does not contain ingredients listed in APPENDIX A of 40 CFR 355 as an extremely hazardous substance (EHS):

SECTIONS 311 & 312 - M.S.D.S. REQUIREMENTS (40 CFR 370):

This product contains ingredients listed in APPENDIX A of 40 CFR 355 and hazardous chemicals under 29 CFR 1910.1200 (c). The product should be reported under the following E.P.A. hazard categories:

x Immediate (Acute) health hazard — x Delayed (Chronic) health hazard

___ Fire Hazard — ___ Sudden release of pressure hazard

___ Reactive hazard

Under Section 311, submittal of MSDS's or a list of product names to the local emergency planning commision, state emergency response commission, the local fire department is required after October 17,1987. Consult the regulation for pertinent changes and updates.

SECTION 13 REGULATORY DATA (Continued)

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):

This product does not contain ingredients listed under 40 CFR 372.65.

TOXIC SUBSTANCE CONTROL ACT (TSCA): The chemical ingredient(s) in this product are listed on the 8(b) Inventory List (40 CFR 710).

RESOURCE CONSERVATION & RECOVERY ACT (RCRA), 40 CFR 261 SUBPARTS C & D:

Please refer to Section 10, disposal information for pertinent data.

TOTAL TOXIC ORGANICS

This product does not contain ingredients on the List of Total Toxic Organics.

STATE REGULATIONS:

California Proposition 65:

This product complies with the MSDS and labeling requirements of the Safe Drinking Water and Toxic Enforcement Act of 1986.

Michigan Critical Materials:

This product does not contain ingredients listed on the Michigan Critical Materials Register.

State Right-to-Know Laws:

Please consult your particular state's right-to-know law.

MacDermid Incorporated

245 FREIGHT STREET · WATERBURY, CT 06702 · TELEPHONE (203)575 5700 · TELEX 4438011 · FAX 203-575-5630

MATERIAL SAFETY DATA SHEET

Product: Metex M-629 **Issue Date: 08/14/73**

Product Code: 13001 **Revised Date: 10/05/90**

24 Hour Emergency Number: CHEMTREC (1-800-424-9300)

1 9

SECTION 13 REGULATORY DATA (Continued)

INTERNATIONAL REGULATIONS:

Canadian Domestic Substance List (CDSL):

The chemical ingredients in this product are listed with the C.D.S.L.

The information listed above does not include all Federal, State, and International regulations. The regulations listed above may change from time to time; it is the user's responsibility to keep advised of current regulatory requirements.

Prepared by MacDermid Inc. Safety & Regulatory Compliance Department, based upon publicly available reference information.

SECTION 14 USER NOTIFICATION

To the best of our knowledge the information contained herein is correct. All chemicals may present unknown health hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist. Final determination of suitibility of the chemical is the sole reponsibility of the user. Users of any chemical should satisfy themselves that the conditions and methods of use assure that the chemical is used safely. NO REPRESENTATIONS OR WARRANTIES, EITH EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER NATURE ARE MADE HERE UNDER WITH RESPECT TO THE INFORMATION CONTAINED HEREIN OR THE CHEMICAL TO WHICH THE INFORMATION REFERS.

* SWMU 2, 14
JAN 07 1991 9, 10, 11

General Chemical

PRODUCT SAFETY DATA SHEET

SULFURIC ACID

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☒ C.A.S. NO. ☐ GENERAL PRODUCT CODE #
SULFURIC ACID	7664-93-9

CHEMICAL NAME AND/OR SYNONYM

SULFURIC ACID Synonym: battery acid

FORMULA	MOLECULAR WEIGHT
H_2SO_4 (Various Concentrations) in water	98.08

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

GENERAL CHEMICAL CORPORATION
90 East Halsey Road
Parsippany, N.J. 07054

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Manager of Product Safety	(201) 515-1840	July, 1989	May, 1990

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(800) 631-8050

SKIN OR EYES: Immediately flush with plenty of water continuing for at least 15 minutes. Remove contaminated clothing while washing. Continue flushing with water if medical attention is not immediately available.

INGESTION: Do not induce vomiting. If conscious, give several glasses of milk (preferred) or water.

INHALATION: Remove to fresh air. Observe for possible delayed reaction. If breathing has stopped, give artificial respiration. If breathing with difficulty, give oxygen, provided a qualified operator is available.

GET IMMEDIATE MEDICAL ASSISTANCE for ingestion, inhalation, eye contact, irritation, or burns.

C. HAZARDS INFORMATION

HEALTH

INHALATION

Inhalation of fumes or acid mist can cause irritation or corrosive burns to the upper respiratory system, including nose, mouth, and throat. Lung irritation and pulmonary edema can also occur. LC_{50} (mist, animals): 20-60 mg/cu.m. – Ref. (a).

INGESTION

Can cause irritation and corrosive burns to mouth, throat, and stomach. Can be fatal if swallowed. Applicable to dilute solutions: LD_{50} (rat): 2140 mg/kg – Reference (b).

SKIN

Can cause severe burns.

EYES

Liquid contact can cause irritation, corneal burns, and conjunctivitis. Blindness may result, or severe or permanent injury. Mist contact may irritate or burn. Reference (b).

PERMISSIBLE CONCENTRATION: AIR (SEE SECTION J)		BIOLOGICAL
TLV: same (ACGIH)	1 mg/m³ (as H_2SO_4) (OSHA) IDLH 80 mg/m³	None.

UNUSUAL CHRONIC TOXICITY

(1) Erosion of teeth, (2) lesions of the skin, (3) tracheo-bronchitis, (4) mouth inflammation, (5) conjunctivitis, (6) gastritis. – Reference (a).

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
0 C Not flammable ☐ OPEN CUP ☐ CLOSED CUP	0 C Not applicable	LOWER - Not applicable UPPER - Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS

Flammable and potentially explosive hydrogen gas can be generated inside metal drums and storage tanks. Concentrated sulfuric acid can ignite combustible materials on contact.

D. PRECAUTIONS PROCEDURES

FIRE EXTINGUISHING AGENTS RECOMMENDED

If involved in a fire, use water spray; avoid spraying water into containers. If only a small amount of combustibles is present, smother fire with dry chemical.

FIRE EXTINGUISHING AGENTS TO AVOID

Use water spray or other suitable agent for fires adjacent to non-leaking tanks or other containers of sulfuric acid.

SPECIAL FIRE FIGHTING PRECAUTIONS

Do not use solid water streams near ruptured tanks or spills of sulfuric acid. Acid reacts violently with water and can spatter acid onto personnel.

VENTILATION

Sufficient to reduce vapor and acid mists to permissible levels. Packaging and unloading areas and open processing equipment may require mechanical exhaust systems. Corrosion-proof construction recommended. Closed ventilation systems (e.g. vapor hoods) are frequently used in the electronics industry.

NORMAL HANDLING

Do not get in eyes, on skin, on clothing. Do not breathe vapor or mist. Use protective equipment outlined in Section E. Procedures are detailed in references listed in Section J. Do not add water to acid. When diluting, always add acid to water cautiously and with agitation. Use only with adequate ventilation.

STORAGE

Protect from physical damage. Store in cool, well-ventilated area away from combustibles and reactive chemicals. Keep out of sun and away from heat. Keep containers upright. No smoking in storage area.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT - SECTION E)

Dilute small spills or leaks cautiously with plenty of water. Neutralize residue with alkali such as soda ash or lime. Adequate ventilation is required for soda ash due to release of CO_2 gas. (See Section I for disposal methods). No smoking in spill area. Major spills must be handled by a predetermined plan. Diking with soda ash is recommended. Consult References, Section J. Attempt to keep out of sewer. Any release to the environment of these products may be subject to Federal and/or state reporting requirements. Check with appropriate agencies.

SPECIAL PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS

SIGNAL WORD - DANGER!

Loosen closures carefully. For carrying glass bottles, use rubber protective enclosures.
If stored in metal containers, vapors can contain explosive hydrogen gas.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

SEE PAGE 5.

EYES AND FACE

SEE PAGE 5.

HANDS, ARMS, AND BODY

SEE PAGE 5.

OTHER CLOTHING AND EQUIPMENT

SEE PAGE 5.

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS)	APPEARANCE AND ODOR	
☒ LIQUID ☐ SOLID ☐ GAS ☐ _____	Oily, colorless to slightly yellow, clear to turbid liquid. Odorless.	
BOILING POINT Approx. 310 °C For 94% MELTING POINT Approx. -27 °C	SPECIFIC GRAVITY (H2O = 1) (liquid) 1.842	VAPOR DENSITY (AIR = 1) Not applicable
SOLUBILITY IN WATER (% by Weight) Complete	pH 1% solution: pH = 0.9	VAPOR PRESSURE (mm Hg at 20°C) ☒ (PSIG) ☐ < 0.001
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☐ Not applicable	% VOLATILES BY VOLUME (At 20°C) Not applicable	

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Temperatures of 300 deg. C or higher: yields sulfur trioxide gas, which is toxic, corrosive, and an oxidizer.

INCOMPATIBILITY (MATERIALS TO AVOID)

Nitro compounds, carbides, dienes, alcohols (when heated): cause explosions -- Refs. (g,h). Oxidizing agents, such as chlorates and permanganates: cause fires and possibly explosions. Allyl compounds and aldehydes: undergo polymerization, possibly violent -- Ref. (g), (continued, Section K).

HAZARDOUS DECOMPOSITION PRODUCTS

Sulfur trioxide gas: see above. Also this is a fire risk if in contact with organic materials.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	NA

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT / C.A.S. #	WT. %	HAZARD DATA (SEE SECT. J)
NOT APPLICABLE		

I. ENVIRONMENTAL

DEGRADABILITY (AQUATIC TOXICITY)

Aquatic Toxicity
24 5 ppm/24 hr /bluegill/lethal/fresh water
42.5 ppm/48 hr /prawn/LC_{50}/salt water

BIOACCUMULATION/PARTITION COEFFICIENT
ND

EPA HAZARDOUS SUBSTANCES (CLEAN WATER ACT SEC. 311) ☒ YES ☐ NO

IF SO REPORTABLE QUANTITY 1000 # (100% H_2SO_4 basis) — 40 CFR 116-117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL OPTIONAL OR DISCHARGE LAWS)

Treatment or disposal of waste generated by use of this product should be reviewed in terms of applicable federal, state and local laws and regulations. Users are advised to consult with appropriate regulatory agencies before discarge, treatment or disposal.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED
EPA Hazardous Waste

HAZARDOUS WASTE NUMBER (IF APPLICABLE)
No. D0002 (corrosive) — 40 CFR 261.22

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

(1) OSHA Z-List; 29 CFR 1910.1000 (Revised 1989)
(2) ACGIH 1989-90 List, "Threshold Limit Values for Chemical Substances...".
Am. Conf. of Governmental Industrial Hygienists, Cincinnati 45202

REGULATORY STANDARDS

D.O.T. Hazardous Materials Table 49 CFR 172.101

D.O.T. CLASSIFICATION: Corrosive material — 49 CFR 173

DOT ID Number: UN 1830.

GENERAL

(a) Documentation of the Threshold Limit Values, 4th Edition, 1981, Am. Conf. of Governmental Hygienists, Cincinnati 45202.
(b) NIOSH, Registry of Toxic Effects of Chemical Substances, 1982-83, Accession #WS 556 00 000, PB81-154478, Nat. Tech. Info. Service, Springfield, VA 22161.
(c) "Criteria for a Recommended Standard...Occupational Exposure to Sulfuric Acid", NIOSH U.S. Dept. of HHS, 1974, PB233098, Nat. Tech. Info. Service, Springfield, VA 22161

K. ADDITIONAL INFORMATION

J. REFERENCES – General (continued)

(d) NIOSH/OSHA, "Pocket Guide to Chemical Hazards...", September, 1985.
(e) "NIOSH/OSHA – Occupational Health Guidelines for Chemical Hazards – Sulfuric Acid", 1978.
(f) Allied Chemical Technical Service Report for storage and handling procedures.
(g) NFPA Manual 491M, "Manual of Hazardous Chemical Reactions, 1987 Nat. Fire Protection Assoc., Boston 02210.
(h) Bretherick, L., Handbook of Reactive Chemical Hazards, 3rd Ed., 1985 Butterworths, Boston.

G. REACTIVITY DATA – Incompatibility (continued)

Alkalis, amines, water, hydrated salts, carboxylic acid anhydrides, nitriles, olefinic organics, glycols, aqueous acids: cause strong exothermic reactions. – Refs. (g, h). Carbonates, cyanides, sulfides, sulfites, metals such as copper: yield toxic gases. – Refs. (h). Also for metals, see hydrogen generation, Section C.

PSDS FILE NO. - GC-2000

SECTION E PROTECTIVE EQUIPMENT

1. HEAVY HANDLING

Respiratory Protection

Where required, use a respirator approved by NIOSH for sulfuric acid. If misting above 1 mg H_2SO_4/ wear: (a) gas mask with acid gas canister and also with high-efficiency particulate filter; (b) High-efficiency particulate respirator; (c) other choices, Reference (d).

Eyes and Face

As a minimum, wear hat, chemical safety goggles, and optionally full-face plastic shield. Do not wear contact lenses.

Hands, Arms, and Body

As a minimum, wear acid-resistant* apron, protective clothing, boots, and gloves for routine product use. For increased protection, include acid-resistant trousers and jacket.

2. SPECIALIZED HANDLING

(only applicable when using the closed ventilation system mentioned on p. 2):

Respiratory Protection

Generally not required. For emergency, e.g. a misting situation, use a respirator approved by NIOSH for sulfuric acid. See this page, under "1. HEAVY HANDLING – Respiratory Protection".

Eyes and Face

As a minimum, safety glasses with nonperforated sideshields. Add a face shield if pouring liquid. For leak or spill or other emergency, use chemical safety goggles and optionally, full face shield. Do not wear contact lenses.

Hands, Arms, and Body

As a minimum, wear acid-resistant apron and gloves*. For leak or spill or other emergency, use full protective clothing (see this page under "1. HEAVY HANDLING – Hands, Arms, and Body)".

Other Clothing and Equipment

Eyewash and quick-drench shower facilities.
Neutralization supplies and equipment.

*Preferably rubber.

* SWMU 3

CONTACTS METALS WELDING

C M W INC. MATERIAL SAFETY DATA SHEET MSDS 93.201

70 S. Gray Street
P.O. Box 2266
Indianapolis, IN 46206
Telephone 317-634-8884
FAX: 317-638-2706

NFPA RATINGS
Health 3
Flammability 0
Reactivity 3

SECTION I

CHEMICAL FAMILY: Mixed Inorganic Acids
CHEMICAL NAME: Sulfuric Acid, Nitric Acid, Hydrochloric Acid Mixture
TRADE NAME: Bright Dip for Copper

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT	CAS REGISTRY #	%	ACGIH TLV/TWA mg/m³	OSHA PEL/TWA mg/m³
Sulfuric Acid (H_2SO_4)	7664-93-9	40-45	1	1
Nitric Acid (HNO_3)	7697-37-2	5-10	5.2	5
Hydrochloric Acid(HCl)	7647-01-0	<1	7.5 Ceiling	7

The three listed components are subject to reporting requirements of SARA Title III.

SECTION III - PHYSICAL DATA

MELTING POINT °C:	129
VAPOR PRESSURE AT ROOM TEMPERATURE:	8.3
VAPOR DENSITY:	> 1 (Air = 1)
SOLUBILITY IN WATER:	Complete
PERCENT VOLATILE (BY VOLUME %):	56.5 at 122 C
SPECIFIC GRAVITY (g/cc)	1.44
APPEARANCE:	Yellow Liquid

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT AND METHOD: N/A
AUTOIGNITION TEMPERATURE °C: N/A
FLAMMABILITY LIMITS IN AIR: UPPER: N/A LOWER: N/A
EXTINGUISHING MEDIA: Dry Chemical or CO_2
FIRE FIGHTING PROCEDURES: Use self contained breathing apparatus with a full face piece operated in a pressure demand or positive pressure mode; full body prtotective clothing when fighting fire.
UNUSUAL FIRE AND EXPLOSION HAZARDS: The acid mixture reacts with most metals to release hydrogen gas which can form explosive mixtures with air. Never add water to the acid mixture because an exothermic reaction could result.

References:
Threshold Limit Values and Biological Exposure Indices, ACGIH, 1991-1992
Code of Federal Regulations - Labor §29, Rev. July 1, 1990
Pocket Guide to Chemical Hazards, NIOSH, 1990
Chemical Regulatory Cross Reference, 3rd Edition, J. J. Keller, 1990
"NFPA Hazard Rating Index Chart", Labor Safety Supply Co., 1987
Fire Protection Guide on Hazardous Materials, 9th Edition, Quincy, MA, 1986
Registry of Toxic Effects of Chemical Substances, NIOSH, 1985-1986
Occupational Health Guidelines for Chemical Hazards, NIOSH/OSHA, 1981
Dangerous Properties of Industrial Materials, 5th Edition, Van Nostrand Reinhold Co., 1979

CONTACTS METALS WELDING

C M W INC. **MATERIAL SAFETY DATA SHEET MSDS 93.201**

70 S. Gray Street
P.O. Box 2266
Indianapolis, IN 46206
Telephone: 317-634-8864
FAX: 317-638-2706

NFPA RATINGS
Health ... 3
Flammability ... 0
Reactivity ... 2

SECTION I

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Occupational Health Guidelines for Chemical Hazards, NIOSH/OSHA, 1981
Dangerous Properties of Industrial Materials, 5th Edition, Van Nostrand Reinhold Co., 1979

* SWMU #3

DU PONT

Du Pont Chemicals

MSDS
MATERIAL SAFETY DATA SHEET

4366CR | Revised 13-Jul-90 | Printed 10-Mar-92

Hydrochloric Acid Solutions

MATERIAL IDENTIFICATION

Corporate Number	DU000030
Manufacturer/Distributor	Du Pont 1007 Market Street Wilmington, DE 19898
Phone Numbers	Product Information 1-(800)441-7515 Transport Emergency 1-(800)424-9300 Medical Emergency 1-(800)441-3637
Grade	20 & 22 DEG, TECHNICAL AND FOOD PROCESSING
Chemical Family	MINERAL ACID
Trade Names and Synonyms	MURIATIC ACID AQUEOUS HCL
CAS Name	HYDROCHLORIC ACID
CAS Number	7647-01-0
Formula	HCl
Molecular Weight	36.46
TSCA Inventory Status	Reported/Included
NFPA Ratings	Health: 3 Flammability: 0 Reactivity: 0
NPCA-HMIS Ratings	Health: 3 Flammability: 0 Reactivity: 0 Personal Protection rating to be supplied by user depending on use conditions.

(continued)

COMPONENTS

Material	CAS Number	Percent
*HYDROGEN CHLORIDE (20 DEG)	7647-01-0	31.5
*HYDROGEN CHLORIDE (22 DEG)	7647-01-0	35.2
WATER	7732-18-5	64.8
		TO
		68.5

* Regulated as a Toxic Chemical under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

PHYSICAL DATA

Evaporation Rate	(Butyl Acetate = 1.0) Greater than 1
Water Solubility	100 WT %
pH	Less than 1
Odor	Acrid, Pungent
Form	Clear Liquid
Color	Colorless to Light Yellow

	20 deg Tech. and Food Processing	22 deg Tech. and Food Processing
Boiling Point (760 mmHg)	84 C (183 F)	62 C (144 F)
Freezing Point	-52.5 (-62.5 F)	-66 C (-86.8 F)
Specific Gravity	1.16	1.18
Vapor Pressure	35 mmHg at 25 C (77 F) 77 mmHg at 38 C (100 F)	84 mmHg at 20 C (68 F) 212 mmHg at 38 C (100 F)

HAZARDOUS REACTIVITY

Instability	Stable.
Incompatibility	Incompatible with most metals, giving hydrogen; with oxidizing agents, giving chlorine; with cyanides, giving hydrogen cyanide; with sulfides, giving hydrogen sulfide; and with formaldehyde, giving bischloromethyl ether (an OSHA regulated carcinogen).
Decomposition	Heat can cause evolution of gaseous hydrogen chloride.
Polymerization	Polymerization will not occur.

(continued)

FIRE AND EXPLOSION DATA

Flash Point	Will not burn
Fire and Explosion Hazards	May generate flammable, potentially explosive hydrogen gas on contact with most metals. Explosive concentrations of hydrogen may accumulate inside metal equipment. Hydrochloric acid fumes may be released from heating under fire conditions.
Extinguishing Media	Use media appropriate for surrounding material.
Special Fire Fighting Instructions	Keep personnel removed & upwind of fire. Wear self-contained breathing apparatus. Wear full protective equipment. Cool tank/container with water spray. Runoff from fire control may be a pollution hazard. **Neutralize with lime, soda ash, etc., to prevent corrosion of metals and formation of hydrogen. For potential exposure to acid or fumes, wear full protective clothing with hood and breathing air supply.**

HEALTH HAZARD INFORMATION

This compound is corrosive and causes burns of the eyes and skin. It is a nose and throat irritant causing symptoms of cough, burning in the throat, and choking sensation. High or prolonged inhalation exposure may cause pulmonary edema with cough, chest discomfort, and difficulty in breathing. Ingestion may cause severe acid burns of the mouth, throat, esophagus, and stomach with burning pain of the mouth, throat, chest, and abdomen. Vomiting and diarrhea of dark blood may occur with penetration of the esophagus or stomach.

Gross overexposure can cause death.

ANIMAL DATA:

Inhalation 1-hour LC50: 2810 ppm in rats
Oral LD50: 900 mg/kg in rabbits

The compound is corrosive to eyes and skin. Toxic effects described in animals from single inhalation exposures include respiratory irritation, corneal opacity, and corrosion of mucosal surfaces. Repeated and long-term inhalation exposures produced changes in the nasal cavity with necrosis, and reduced weight gain. Long-term exposures also produced decreased liver weights. By ingestion, a single exposure produced gastric mucosal damage. Administration of repeated oral doses produced decreased weight gain, mortalities, and nonspecific changes. Long-term dosing resulted in decreased relative and absolute spleen weights.

(continued)

Tests in animals demonstrate no carcinogenic activity. Tests have not been performed for mutagenic, developmental, or reproductive effects.

HUMAN HEALTH EFFECTS:

Human health effects of overexposure by skin or eye contact include skin burns or ulceration; or eye corrosion with corneal or conjunctival ulceration. By inhalation, the effects include irritation of the upper respiratory passages with coughing and discomfort. Ingestion causes severe acid burns of the mouth, throat, esophagus, and stomach with burning pain of the mouth, throat, chest, and abdomen. Vomiting and diarrhea of dark blood may occur with penetration of the esophagus or stomach.

Higher inhalation exposures may lead to corrosion of mucosal surfaces with temporary lung irritation with cough, difficulty in breathing, or shortness of breath; or dental erosion. Fatality may occur from gross overexposure.

Carcinogenicity	None of the components in this material is listed by IARC, NTP, OSHA, or ACGIH as a carcinogen.
Exposure Limits	
Hydrochloric Acid Solutions	
AEL * (Du Pont)	5 ppm - 15 Min. TWA
TLV (ACGIH)	5 ppm, 7.5 mg/m3 (Ceiling)
PEL (OSHA)	5 ppm, 7 mg/m3 (Ceiling)

* AEL is Du Pont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence

Safety Precautions	Avoid breathing vapors or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

FIRST AID

In case of eye contact: Immediately flush eyes with large quantities of water while holding the eyelids apart. Continue flushing for at least 5 minutes. Do not try to neutralize the acid. Call a physician immediately. Transfer promptly to a medical facility. Apply cool packs on the eyes while transporting the patient. Avoid freezing affected area.

In case of skin contact: Immediately shower with large quantities of water within seconds of contact or suspected contact, and completely remove all personal protective equipment, clothing, and shoes while in the shower. Flush the skin thoroughly with water for at least 5 minutes. Call for medical help while flushing the skin. Keep affected area cool. Avoid freezing affected area. Wash clothing before reuse.

(continued)

FIRST AID (continued)

If inhaled: Remove the patient to an uncontaminated atmosphere. Call a physician. Check for breathing and pulse. Give oxygen as soon as possible (6 liters per minute). Check for other injuries. If not breathing, give artificial respiration. Keep patient warm and at rest.

If swallowed: Do not induce vomiting. Give large quantities of water. Call a physician immediately, and transfer promptly to a medical facility. Never give anything by mouth to an unconscious person.

PROTECTION INFORMATION

Generally Applicable Control Measures and Precautions

Keep container in a cool place. Keep container tightly closed.

Good general ventilation should be provided to keep fume and mist concentrations below exposure limits.

Personal Protective Equipment

Have available and wear as appropriate for exposure conditions when handling containers or operating equipment containing hydrochloric acid solution:

EYE/FACE:

Chemical splash goggles. In addition, wear a full-length face shield where the possibility exists for face contact due to splashing or spraying of the material.

RESPIRATORS:

NIOSH/MSHA approved respiratory protection.

PROTECTIVE CLOTHING:

Acid-proof gauntlet gloves, apron, and boots; hard hat with brim; long sleeve wool, polyester, or acrylic clothing; complete acid suit with hood.

In cases of emergency, or where there is a possibility of considerable exposure, wear a complete acid suit with hood, gloves, boots, and breathing air supply.

DISPOSAL INFORMATION

Aquatic Toxicity

Hydrochloric Acid is slightly toxic. The 96-hr LC50 in mosquito fish is 282 mg/L.

Spill, Leak, or Release

NOTE: Review FIRE AND EXPLOSION HAZARDS and SAFETY PRECAUTIONS before proceeding with clean up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean up.
Dike spill. Prevent liquid from entering sewers, waterways or low areas.
Superfund reportable discharge = 5000 lbs.

(continued)

DISPOSAL INFORMATION (continued)

	Evacuate area, keep upwind until gas has dispersed. Wear self-contained breathing apparatus if necessary to enter spill area. Dike large spills. After bulk removal, flush with plenty of water applied to entire spill area. Neutralize washings with lime or soda ash. Do not flush to sewer before neutralizing. Comply with Federal, State and local regulations on reporting releases.
Waste Disposal	Treatment, storage, transportation and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Do not flush to surface water or sanitary sewer system. This material may be a RCRA Hazardous Waste. If approved, recover or drain neutralized washing to a waste treatment plant or transfer to a licensed disposal contractor.

SHIPPING INFORMATION

DOT	
Proper Shipping Name	HYDROCHLORIC ACID
Hazard Class	CORROSIVE MATERIAL
UN/NA No.	UN1789
DOT Labels(s)	CORROSIVE
DOT Placard	CORROSIVE
DOT/IMO	
Proper Shipping Name	HYDROCHLORIC ACID SOLUTION
Hazard Class	CORROSIVE MATERIAL, 8
UN No.	1789
Special Information	IMO Label: CORROSIVE
Packaging Group	II
Reportable Quantity	5000 lbs.
Shipping Containers	Tank cars, tank trucks

STORAGE CONDITIONS

Store in cool place. Keep container tightly closed.

Keep away from heat, sparks, and flame. Do not store or mix with cyanides, sulfides, or formaldehyde. Protect containers from damage.

(continued)

TITLE III HAZARD CLASSIFICATIONS

Acute	Yes
Chronic	Yes
Fire	No
Reactivity	No
Pressure	No

LISTS:

Extremely Hazardous Substance -No*
CERCLA Hazardous Substance -Yes
Toxic Chemicals -Yes

*Yes for HCl gas only.

CANADIAN WHMIS CLASSIFICATION
D-1B; E

ADDITIONAL INFORMATION AND REFERENCES

For further information, see Du Pont Hydrochloric Acid "Storage and Handling Bulletin" and "Data Sheet."

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS:

W. J. Brock
Du Pont, C & P Department
P.O. Box 80709, Chestnut Run
Wilmington, DE 19880-0709
302-999-4946

# Indicates updated section

End of MSDS

* SWMU 3

JH JONES-HAMILTON CO.

JUL 1 3 1990

MATERIAL SAFETY DATA SHEET

MANUFACTURER'S NAME/ADDRESS:
JONES-HAMILTON CO.
8400 ENTERPRISE DRIVE
NEWARK, CA 94560
OR
30354 TRACY ROAD
WALBRIDGE, OHIO 43465

EMERGENCY PHONE NUMBERS:
(415) 797-2471 OR
(415) 797-4500
OR
(419) 666-9838
(419) 666-6337
CHEMTREC: (800) 424-9300

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: SODIUM BISULFATE, ANHYDROUS GLOBULAR, TECHNICAL
CHEMICAL FORMULA: $NaHSO_4$
CAS NUMBER : 7681-38-1
NIOSH REGISTRY NO.: UNKNOWN
GENERAL OR GENERIC ID: SODIUM ACID SULFATE, NITRE CAKE, SODIUM HYDROGEN SULFATE
HAZARD CLASSIFICATION (DOT): NOT CLASSIFIED AS HAZARDOUS
UN NO.: 1821
OSHA HAZARD COMMUNICATIONS HEALTH HAZARD CLASSIFICATION: IRRITANT
SARA TITLE III HAZARD CATEGORY: ACUTE
HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS) RATING: 1-0-1-F
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATING: 1-0-1

SECTION II - HAZARDOUS COMPONENTS

INGREDIENT	PERCENT BY WEIGHT	PEL	TLV
SODIUM BISULFATE	93.2	NONE ESTABLISHED	NONE ESTABLISHED
SODIUM SULFATE	6.5	NONE ESTABLISHED	NONE ESTABLISHED

SECTION III - PHYSICAL DATA

PROPERTY	VALUE
MELTING POINT	350°F
BULK DENSITY	83 LB/CU.FT.
SOLUBILITY	100%
PERCENT VOLATILE	NON-VOLATILE

DESCRIPTION: OFF-WHITE, BEAD-LIKE, GRANULAR DRY MATERIAL.

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT: NOT APPLICABLE, WILL NOT BURN.

EXPLOSIVE LIMITS: UPPER: NOT APPLICABLE LOWER: NOT APPLICABLE

EXTINGUISHING MEDIA: WATER OR DRY CHEMICAL AS APPROPRIATE FOR COMBUSTIBLES IN AREA. AVOID WATER CONTACT TO MATERIAL IF POSSIBLE.

HAZARDOUS THERMAL DECOMPOSITION PRODUCTS: AT TEMPERATURES OVER 570° F, PRODUCT WILL DECOMPOSE, GENERATING OXIDES OF SULFUR.

UNUSUAL FIRE AND EXPLOSION HAZARDS: PRODUCT READILY DISSOLVES IN WATER TO FORM A WEAK SULFURIC ACID SOLUTION. NO GASES OR TOXIC FUMES ARE EMITTED FROM THIS REACTION, BUT PRECAUTIONS FOR EXPOSURE TO SULFURIC ACID SHOULD BE FOLLOWED.

SPECIAL FIRE FIGHTING PROCEDURES: IF WATER IS USED TO EXTINGUISH COMBUSTIBLES AND PRODUCT IS DISSOLVED IN WATER FORMING SULFURIC ACID, WEAR ACID PROTECTIVE EQUIPMENT. IF ELEVATED TEMPERATURES (> 570° F) ARE REACHED, SELF-CONTAINED BREATHING APPARATUS SHOULD BE WORN.

SECTION V - HEALTH HAZARD AREA

PRINCIPAL HEALTH HAZARDS, INCLUDING SIGNIFICANT ROUTES, EFFECTS AND SYMPTOMS OF OVEREXPOSURE AND MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE MAY BE:

EYE: MILD TO SEVERE IRRITANT. MAY CAUSE BURNS IF NOT FLUSHED WITH WATER.

SKIN: MODERATE IRRITANT. MAY CAUSE BURNS IF NOT FLUSHED WITH WATER.

INHALATION: IRRITANT. MAY IRRITATE OR BURN NOSE, THROAT AND LUNGS. NO EXPOSURE LIMITS ESTABLISHED.

INGESTION: IRRITANT. MAY IRRITATE OR BURN MOUTH, ESOPHAGUS OR STOMACH. ANIMAL TEST DATA: LD_{50} RAT 2800 MG/KG.

CARCINOGENICITY: NOT LISTED AS CARCINOGEN BY NTP, IARC OR OSHA.

FIRST AID:
IN EYES: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES, LIFTING EYELIDS TO THOROUGHLY FLUSH. GET PROMPT MEDICAL ATTENTION.

ON SKIN: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES. IF BURN OCCURS, OBTAIN MEDICAL HELP.

IF INHALED: MOVE TO FRESH AIR LOCATION. IF IRRITATION OR DISCOMFORT PERSISTS, SEEK MEDICAL ATTENTION.

IF SWALLOWED: DRINK LARGE QUANTITIES OF MILK OR WATER. FOLLOW WITH MILK OF MAGNESIA, BEATEN EGGS OR VEGETABLE OIL. DO NOT INDUCE VOMITING. CONTACT PHYSICIAN IMMEDIATELY.

NOTES TO PHYSICIAN:

EYES: NATURAL WATERING OF EYES WILL DISSOLVE SODIUM BISULFATE, FORMING A WEAK SULFURIC ACID SOLUTION WHICH MAY CAUSE BURNS. FLUSH AFFECTED AREA THOROUGHLY WITH WATER. DO NOT USE CHEMICAL ANTIDOTES OR NEUTRALIZING SOLUTIONS.

SKIN: MILD BURNS MAY OCCUR IF NOT THOROUGHLY FLUSHED PREVIOUSLY.

INHALATION: MILD BURNING SENSATIONS MAY OCCUR TO MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.

INGESTION: BODY WATER CONTENT WILL REACT WITH SODIUM BISULFATE TO FORM A WEAK SULFURIC ACID SOLUTION, WHICH MAY BURN TISSUES IN MOUTH, ESOPHAGUS OR STOMACH. SOLUTION SHOULD BE DILUTED TO REDUCE BURNING EFFECT.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH STRONG ALKALINE MATERIALS SUCH AS CAUSTIC. REACTS WITH WATER TO FORM WEAK SULFURIC ACID SOLUTION.

CONDITIONS TO AVOID: STORE IN DRY AREA TO AVOID MOISTURE CONTACT.

HAZARDOUS DECOMPOSITION: NONE, UNLESS HEATED OVER 570°F, AT WHICH SULFUR DIOXIDE AND SULFUR TRIOXIDE ARE FORMED.

SECTION VII - SPILL OR LEAK PROCEDURES

SMALL SPILLS: MATERIAL IS A GRANULAR PRODUCT AND CAN BE SWEPT UP FROM SURFACES.

LARGE SPILL: PICK UP AS MUCH MATERIAL AS POSSIBLE WITH SHOVEL OR OTHER TOOL. NEUTRALIZE BALANCE OF SPILL WITH WEAK ALKALINE SOLUTION AND WASH DOWN TO SEWER IF FEDERAL, STATE OR LOCAL REGULATIONS PERMIT.

WASTE DISPOSAL METHODS: COMPLY WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS.

SECTION VIII - PROTECTIVE EQUIPMENT TO BE USED

VENTILATION: LOCAL VENTILATION TO A DUST COLLECTOR IS RECOMMENDED.

RESPIRATORY PROTECTION: NIOSH OR MSA CERTIFIED DUST MASK SHOULD BE WORN WHILE HANDLING PRODUCT TO CONTROL EXPOSURE BELOW NUISANCE DUST LIMITS OF 10 MG/M^3.

PROTECTIVE GLOVES: WEAR ACID RESISTANT GLOVES SUCH AS RUBBER OR NEOPRENE.

SECTION VIII - PROTECTIVE EQUIPMENT TO BE USED (CONT.)

EYE PROTECTION: SAFETY GLASSES OR GOGGLES.

OTHER PROTECTIVE EQUIPMENT: CLOTHES SHOULD COMPLETELY COVER SKIN TO AVOID SKIN CONTACT. COATS, COVERALLS OR APRONS ARE RECOMMENDED.

SECTION IX - SPECIAL PRECAUTIONS

AVOID CONTACT WITH SKIN, EYES OR CLOTHING.

DO NOT STORE WHERE EXPOSED TO MOIST CONDITIONS OR NEAR STRONG ALKALIES.

KEEP CONTAINERS TIGHTLY CLOSED.

WEAR ALL RECOMMENDED PROTECTIVE EQUIPMENT WHEN HANDLING.

THE DATA IN THIS MATERIAL SAFETY DATA SHEET RELATES ONLY TO THE SPECIFIC MATERIAL DESIGNATED HEREIN AND DOES NOT RELATE TO USE IN COMBINATION WITH ANY OTHER MATERIAL IN ANY PROCESS. THE INFORMATION SET FORTH HEREIN IS FURNISHED FREE OF CHARGE AND IS BASED ON TECHNICAL DATA THAT JONES-HAMILTON CO. BELIEVES TO BE RELIABLE. IT IS INTENDED FOR USE BY PERSONS HAVING TECHNICAL SKILL AND AT THEIR OWN DISCRETION AND RISK. SINCE CONDITIONS OF USE ARE OUTSIDE OUR CONTROL, WE MAKE NO WARRANTIES, EXPRESS OR IMPLIED, AND ASSUME NO LIABILITY IN CONNECTION WITH ANY USE OF THIS INFORMATION. NOTHING HEREIN IS TO BE TAKEN AS A LICENSE TO OPERATE UNDER OR A RECOMMENDATION TO INFRINGE ANY PATENTS.

DATE OF LATEST REVISION: JUNE, 1990

SIGNATURE/TITLE OF PREPARER: Colby LaPlace

COLBY LA PLACE
CORPORATE MANUFACTURING MANAGER

MANUFACTURING PROCESS STANDARD

MALLORY METALLURGICAL COMPANY
A DIVISION OF P. R. MALLORY & CO. INC.
INDIANAPOLIS, INDIANA 46206

MPS- 13.201 | REV. 3

EFFECTIVE DATE 6/1/55

REVISIONS	
3	CR 010
A	REWRITTEN REV. TITLE AND SCOPE
B	ADDED COOLING
C	ADDED DEGREASE E.F. 1-27-72

TITLE: Chemical Bright Dip Cleaning of Copper and High Copper Alloys to Clean and Prepare Surfaces Prior to Brazing or Welding. Does Not Include Beryllium Copper Alloys Such as Mallory 73 Berylco 25 or Brush 25 Alloy.

SCOPE: This specification covers the materials, equipment, and procedure for chemical bright dip cleaning of copper and high copper alloys to clean and prepare surfaces prior to brazing or welding.

Does not include alloys such as Mallory 73, Berylco 25 or Brush 25 alloy.

Parts or materials having oxide scale or heavy tarnish shall be cleaned by hot sodium bisulfate (MPS 13.204) prior to this procedure.

This specification shall not be used for cleaning contact assemblies.

MATERIALS:

Concentrated Sulfuric Acid (66° Be)
Concentrated Nitric Acid (40° Be)
Concentrated Hydrochloric Acid (37%)
De-ionized water

EQUIPMENT:

Container: Glass, earthenware, lead or rubber-lined tanks.
Glass measures
Rubber or lead pumps for Carboys
Stainless steel basket
Rinse tanks

PREPARATION OF SOLUTION:

		For 10 Gallons
Water	49.1%	4 9/10 gal.
Sulfuric Acid	43.5%	4 1/3 gal.
Nitric Acid	7.2%	3 quarts
Hydrochloric Acid	0.2%	2.6 ounces

1. Place water in container first.
2. Slowly add Sulfuric Acid.
3. Allow solution to cool before further additions.
4. Slowly add Nitric Acid and again allow to cool.
5. Add Hydrochloric Acid.
6. Mix well.
7. Allow solution to cool to room temperature.

* SWMM 3

Oakite

4540

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 4540
OAKITE LIQUI-DET
47-G-950

HMIS 1 0 0 G

SECTION I

ADE NAME	OAKITE LIQUI-DET	EMERGENCY TELEPHONE NUMBER:
HEMICAL NAME		(800) 424-9300 (CHEMTREC)
D SYNONYMS	NA-Mixture	
NUFACTURER'S NAME		
D TELEPHONE NO.	OAKITE PRODUCTS INC. (201) 464-6900 (8am-5pm)	
DDRESS	50 Valley Road Berkeley Heights NJ 07922	

SECTION II - HAZARDOUS INGREDIENTS

	CAS NO.	% BY WT	TLV	PEL	UNITS
thylene glycol butyl ether(+)	0000112345	5-15	NE	NE	
thoxylated cocoamine	0061791148	<10	NE	NE	
odecylbenzene sulfonic acid, oethanolamine salt	0027323417	<10	NE	NE	
anolamine	0000141435	<5	3	3	ppm
odium acid pyrophosphate	0007758169	<5	NE	NE	
-hazardous ingredients		Bal.			

dentified ingredients are considered not hazardous under Federal Hazard mmunication Standard (29 CFR 1910.1200).

) This product contains ingredient(s) identified in Section II with (+) ich are subject to the reporting requirements of section 313 of SARA Title and 40 CFR 372.

SECTION III - PHYSICAL DATA

ILING POINT (F)	>212	SPECIFIC GRAVITY (H20=1)	1.04
OR PRESSURE (mm Hg)	<18	Bulk Density	
OR DENSITY (Air=1)	NE	PERCENT VOLATILE	
LUBILITY IN WATER	Complete	BY VOLUME(%) Excludes H20	<15
PORATION RATE (BuAc=1)	<1	PH	

- Not Applicable

NE - Not Established

MATERIAL SAFETY DATA SHEET

APPEARANCE AND ODOR	Light yellow liquid; perfume odor.	Concentrate	9.8

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used): NONE
FLAMMABLE LIMITS: LEL: NA UEL: NA

EXTINGUISHING MEDIA: Use media suitable for surrounding materials.

SPECIAL FIRE FIGHTING PROCEDURES: Wear Self-Contained Breathing Apparatus (SCBA).

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known.

SECTION V - HEALTH HAZARD INFORMATION

ROUTE(S) OF ENTRY:	INHALATION:	SKIN:	INGESTION:
	X	X	X

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.
SYMPTOMS/EFFECTS OF OVEREXPOSURE:
Inhalation of mist may cause respiratory irritation. Direct contact with skin may cause irritation. Inhalation studies have shown that laboratory animals exposed to extremely high concentrations of ethanolamines have exhibited kidney and liver damage. Eye contact may cause burning and irritation.

FIRST AID

EYES: Immediately flush eyes with large amounts of water for at least 15 minutes while holding eyelids open. If irritation persists get medical attention.

SKIN: Wash affected area with large amounts of water. If irritation persists get medical attention.

INGESTION: Contact local poison control center or physician IMMEDIATELY!

INHALATION: Move victim to fresh air. Get medical help if irritation persists.

SECTION VI - REACTIVITY DATA

NA - Not Applicable NE - Not Established

STABILITY: NORMALLY STABLE
INCOMPATIBLE MATERIALS: Strong acids.
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, Carbon dioxide, Sulfur dioxide, Nitrogen dioxide.

SECTION VII - SPILL OR LEAK PROCEDURES

PROCEDURES: Wear personal protective equipment (See Section VIII). Clean up with absorbant material.

WASTE DISPOSAL METHOD: Dispose of in accordance with Local State and Federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY: If TLV is exceeded, or for symptoms of overexposure, wear a NIOSH-approved organic vapor respirator with a dust and mist pre-filter.

EYEWEAR: Wear chemical safety goggles.

CLOTHING/GLOVES: Wear neoprene or other chemical-resistant gloves.

VENTILATION: Local exhaust may be necessary for some handling/use conditions. Specific needs should be addressed by supervisory or health/safety personnel.

SECTION IX - SPECIAL PRECAUTIONS

Store in closed container. This product does not contain any carcinogens (at 0.1% or greater) as defined by IARC, NTP, or OSHA.

APPROVAL Mgr. Health & Environmental Dept. 01/12/1990

NAME TITLE DATE

NA - Not Applicable NE - Not Established

* Swan 3

Oakite

4520

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 4520
OAKITE LIQUACID
72-E-19

HMIS 3 0 1 J

SECTION I

TRADE NAME	OAKITE LIQUACID	EMERGENCY TELEPHONE NUMBER:
CHEMICAL NAME AND SYNONYMS	NA-Mixture	(800) 424-9300 (CHEMTREC)
MANUFACTURER'S NAME AND TELEPHONE NO.	OAKITE PRODUCTS INC. (201) 464-6900 (8am-5pm)	
ADDRESS	50 Valley Road Berkeley Heights NJ 07922	

SECTION II - HAZARDOUS INGREDIENTS

	CAS NO.	% BY WT	TLV	PEL	UNITS
Phosphoric acid(+)	0007664382	30-40	1	1	mg/m^3
Nitric acid(+)	0007697372	<5	2	2	ppm
Non-hazardous ingredients		Bal.			

Unidentified ingredients are considered not hazardous under Federal Hazard Communication Standard (29 CFR 1910.1200).

(+) This product contains ingredient(s) identified in Section II with (+) which are subject to the reporting requirements of section 313 of SARA Title III and 40 CFR 372.

SECTION III - PHYSICAL DATA

BOILING POINT (F)	>212	SPECIFIC GRAVITY (H20=1)	1.242
VAPOR PRESSURE (mm Hg)	NE	Bulk Density	10.3 lb/gal
VAPOR DENSITY (Air=1)	NE	PERCENT VOLATILE	
SOLUBILITY IN WATER	Complete	BY VOLUME(%) Excludes H2O	0
EVAPORATION RATE (Water=1)	1	PH 15% solution	1.4
APPEARANCE AND ODOR	Yellow liquid; pungent odor.	Concentrate	NE

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

NA - Not Applicable

NE - Not Established

FLASH POINT (Method Used): NONE
FLAMMABLE LIMITS: LEL: NA UEL: NA

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, foam, water spray.

SPECIAL FIRE FIGHTING PROCEDURES: Wear Self-Contained Breathing Apparatus (SCBA).

UNUSUAL FIRE AND EXPLOSION HAZARDS: May have oxidizing properties, therefore, fire risk on contact with combustible materials.

SECTION V - HEALTH HAZARD INFORMATION

ROUTE(S) OF ENTRY:	INHALATION:	SKIN:	INGESTION:
	X	X	X

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.
SYMPTOMS/EFFECTS OF OVEREXPOSURE:
Inhalation of mist may cause severe respiratory irritation. Exposure to high concentrations may cause pneumonitis and pulmonary edema. Symptoms include coughing, chest pain and difficulty breathing. ONSET OF SYMPTOMS MAY BE DELAYED. Eye contact causes severe or permanent damage. Severe skin burns.

FIRST AID

EYES: Immediately flush eyes with large amounts of water for at least 15 minutes while holding eyelids open. Get prompt medical attention.

SKIN: Immediately remove contaminated clothing. Wash skin with large amounts of water for at least 15 minutes. Get prompt medical attention. Wash clothing before reuse.

INGESTION: Contact local poison control center or physician IMMEDIATELY!

INHALATION: Move victim to fresh air and restore breathing if necessary. Stay with victim until emergency medical help arrives.

SECTION VI - REACTIVITY DATA

STABILITY: NORMALLY STABLE
Avoid extreme heat. Avoid direct sunlight.

NA - Not Applicable NE - Not Established

MATERIAL SAFETY DATA SHEET

NCOMPATIBLE MATERIALS: Alkalies, Combustibles. Contact with certain metals may yield explosive hydrogen gas.

ZARDOUS DECOMPOSITION PRODUCTS: Hydrogen. Phosphorous oxides, Nitrogen oxides.

SECTION VII - SPILL OR LEAK PROCEDURES

ROCEDURES: Wear personal protective equipment (See Section VIII). Remove all heat and ignition sources. Ventilate area. Neutralize with soda ash or lime. Clean up with noncombustible absorbant material.

STE DISPOSAL METHOD: Dispose of in accordance with Local State and Federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

SPIRATORY: If TLV is exceeded, wear a NIOSH-approved chemical cartridge respirator or gas mask containing non-oxidizable sorbent.

WEAR: If splash potential exists wear chemical splash goggles or faceshield.

OTHING/GLOVES: If potential for skin contact exists, wear neoprene or other chemical resistant gloves and apron or coveralls and/or foot coverings, as needed.

TILATION: Local exhaust may be necessary for some handling/use conditions. Specific needs should be addressed by supervisory or health/safety personnel.

SECTION IX - SPECIAL PRECAUTIONS

ROSIVE. Store in closed container in well-ventilated area. NOTE:IF LUTING (OR DISSOLVING) ALWAYS ADD THIS PRODUCT TO WATER SLOWLY AND WITH STANT STIRRING. Do not add this product to chlorine-releasing materials. s product does not contain any carcinogens (at 0.1% or greater) as defined IARC, NTP, or OSHA.

PROVAL Michael Chang Mgr. Health & Environmental Dept. 06/18/1991

NAME TITLE DATE

- Not Applicable NE - Not Established

ⓟ SWMM 3

84090488
CMJ INC
70 GRAY ST.
PO BOX 2566
INDIANAPOLIS IN 46206

ORDER NO: 041519060
PROD NO: 04656558

VAN WATERS & ROGERS INC., SUBSIDIARY OF UNIVAR
1600 NORTON BLDG. SEATTLE, WA 98104-1564 (408) 435-8700

EMERGENCY ASSISTANCE

EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL CHEMTREC (800)424-9300

FOR PRODUCT AND SALES INFORMATION

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE

PRODUCT IDENTIFICATION

UCT NAME: SODIUM NITRITE — CAS NO.: 7632-00-0

MON NAMES/SYNONYMS: NITROUS ACID; TIUM SALT — MSDS #: P1174

ULA: NA N O2 — DATE ISSUED: 09/90

CULAR WEIGHT: 69 — SUPERCEDES: 08/89

RD RATING (NFPA 704) — HMIS RATING

LTH: 2
F: 0
TIVITY: 1
IAL: OXY

HAZARD RATING SCALE:
0=MINIMAL 3=SERIOUS
1=SLIGHT 4=SEVERE
2=MODERATE

HEALTH: 2
FIRE: 0
REACTIVITY: 1

HAZARDOUS INGREDIENTS

		EXPOSURE LIMITS, MG/M3			
		OSHA	ACGIH	OTHER	
COMPONENT	%	PEL	TLV	LIMIT	HAZARD
SODIUM NITRITE	>99	15 (NUISANCE DUST)	10 (NUISANCE DUST)	NONE	OXIDIZER, TOXIC

PHYSICAL PROPERTIES

ING POINT, DEG F: DEC. 914 (OMPOSES) — VAPOR PRESSURE, MMHG/20DEG C: N/A

pH: NO DATA FOUND

ING POINT, DEG F: 405-538 — VAPOR DENSITY (AIR=1): N/A
IFIC GRAVITY (WATER=1): 2.17 — WATER SOLUBILITY, %: 45-46
ARANCE AND ODOR: YELLOW S CRYSTALS: ODORLESS — EVAPORATION RATE (BUTYL ACETATE=1): N/A

LATILE (BY VOLUME): NO DATA FOUND

FIRST AID MEASURES

F INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT
REATHING. GET IMMEDIATE MEDICAL ATTENTION.

N CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING
ATER FOR 15 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY.
ET IMMEDIATE MEDICAL ATTENTION.

N CASE OF SKIN CONTACT: IMMEDIATELY WASH SKIN WITH LOTS OF SOAP AND
ATER. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH BEFORE REUSE. GET
EDICAL ATTENTION IF IRRITATION PERSISTS AFTER WASHING.

F SWALLOWED: IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING BY GIVING 2
LASSES OF WATER AND STICKING A FINGER DOWN THE THROAT. CONTINUE UNTIL
OMIT IS CLEAR. GET IMMEDIATE MEDICAL ATTENTION. DO NOT GIVE ANYTHING
O AN UNCONSCIOUS OR CONVULSING PERSON.

OTES TO PHYSICIAN: ABSORPTION OF THIS PRODUCT INTO THE BODY MAY LEAD TO
HE FORMATION OF METHEMOGLOBIN WHICH, IN SUFFICIENT CONCENTRATION, CAUSES
YANOSIS. SINCE REVERSION OF METHEMOGLOBIN TO HEMOGLOBIN OCCURS
PONTANEOUSLY AFTER TERMINATION OF EXPOSURE, MODERATE DEGREES OF CYANOSIS
EED BE TREATED ONLY BY SUPPORTIVE MEASURES SUCH AS BED REST AND OXYGEN
NHALATION. THROUGH CLEANSING OF THE ENTIRE CONTAMINATED AREA OF THE BODY
NCLUDING SCALP AND NAILS IS IF UTMOST IMPORTANCE. IF CYANOSIS IS SEVERE,
NTRAVENOUS INJECTION OF METHYLENE BLUE, 1 MG/KG OF BODY WEIGHT, MAY BE OF
ALUE. CYANOCOBALAMIN (VITAMIN B-12), 1 MG INTRAMUSCULARLY, WILL SPEED
ECOVERY. INTRAVENOUS FLUIDS AND BLOOD TRANSFUSIONS MAY BE INDICATED IN
ERY SEVERE EXPOSURES.

----------------------HEALTH HAZARD INFORMATION-----------------------

RIMARY ROUTES OF EXPOSURE: SKIN OR EYE CONTACT, INHALATION.

IGNS AND SYMPTOMS OF EXPOSURE
INHALATION: INHALATION OF MIST OR DUST MAY IRRITATE THE RESPIRATORY
RACT. LARGE AMOUNTS MAY CAUSE SYSTEMATIC EFFECTS: SEE SWALLOWED.

EYE CONTACT: DUSTS WILL IRRITATE THE EYES AND PROLONGED CONTACT
AY DAMAGE THE EYES CAUSING CORNEAL BURNS.

SKIN CONTACT: CONCENTRATED AQUEOUS SOLUTIONS OR DUST MAY CAUSE
RRITATION. PROLONGED OR REPEATED EXPOSURE CAN RESULT IN TEMPORARILY
ELLOWING THE SKIN. IT HAS BEEN FREQUENTLY ASSOCIATED WITH SKIN
ENSITIZATION IN HUMANS.

SWALLOWED: SWALLOWING THE SOLIDS OR CONCENTRATED AQUEOUS SOLUTION
AUSES IRRITATION OF MOUTH, THROAT, AND STOMACH ALONG WITH FLUSHED FACE,
NEVEN HEART ACTION, DIZZINESS, TREMORS AND NAUSEA. LARGE DOSES CAN
EAD TO CONVERSION OF HEMOGLOBIN TO METHEMOGLOBIN, PRODUCING CYANOSIS,
ARKED FALL IN BLOOD PRESSURE LEADING TO COLLAPSE, COMA, AND POSSIBLY
EATH.

HRONIC EFFECTS OF EXPOSURE: UNDER CERTAIN CONDITIONS, NITRITES MAY
EACT WITH SECONDARY AMINES TO FORM CARCINOGENIC NITROSAMINES.

EDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: PRE-EXISTING
ARDIOVASCULAR OR BONE MARROW DISEASES.

-----------------------------TOXICITY DATA------------------------------

RAL: RAT LD50 = 85 MG/KG; HUMAN TDLO = 14 MG/KG: CNS EFFECTS.

ERMAL: NO DATA FOUND

NHALATION: RAT LC50 = 1.45 MG/L/4 HR

ARCINOGENICITY: THIS MATERIAL IS NOT CONSIDERED TO BE A CARCINOGEN
Y THE NATIONAL TOXICOLOGY PROGRAM, THE INTERNATIONAL AGENCY FOR
ESEARCH ON CANCER, OR THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

THER DATA: REPEATED EXPOSURE PRODUCED METHEMOGLOBINEMIA, DECREASED

[illegible]

[illegible] ... AND NONSPECIFIC ... [illegible]
[illegible]
[illegible] ... PATHOLOGICAL CHANGES IN THE [illegible]
[illegible] KIDNEYS, [illegible], BRAIN, HEART, AND LUNGS.

[illegible] IN ANIMALS DEMONSTRATE NO CARCINOGENIC ACTIVITY, OR REPRODUCTIVE OR
[illegible]DEVELOPMENTAL TOXICITY. SODIUM NITRITE APPEARS TO CROSS THE PLACENTA
[illegible]ING METHEMOGLOBINEMIA IN THE FETUS AFTER ADMINISTRATION TO THE DAM. IN
[illegible] TEST, BUT NO IN OTHERS. THE COMPOUND PRODUCED GENETIC DAMAGE IN
[illegible]TERIAL AND MAMMALIAN CELL CULTURES AS WELL AS IN TESTS IN ANIMALS. IT
[illegible] NOT PRODUCE HERITABLE GENETIC DAMAGE.

-------------------------PERSONAL PROTECTION-------------------------

[illegible]ILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MINIMIZING
[illegible]T EMISSIONS AT THE POINT OF USE.

[illegible]PIRATORY PROTECTION: IF USE CONDITIONS GENERATE DUSTS, WEAR A NIOSH-
[illegible]PROVED RESPIRATOR APPROPRIATE FOR THOSE EMISSION LEVELS. APPROPRIATE
[illegible]SPIRATORS MAY BE A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CART-
[illegible]GE RESPIRATOR WITH PARTICULATE FILTERS, A SELF-CONTAINED BREATHING
[illegible]ARATUS IN THE PRESSURE DEMAND MODE, OR A SUPPLIED-AIR RESPIRATOR.

[illegible]E PROTECTION: CHEMICAL GOGGLES UNLESS A FULL FACEPIECE RESPIRATOR IS
[illegible]O WORN. IT IS GENERALLY RECOGNIZED THAT CONTACT LENSES SHOULD NOT BE
[illegible]N WHEN WORKING WITH CHEMICALS BECAUSE CONTACT LENSES MAY CONTRIBUTE
[illegible]THE SEVERITY OF AN EYE INJURY.

[illegible]OTECTIVE CLOTHING: LONG-SLEEVED SHIRT, TROUSERS, SAFETY SHOES, RUBBER
[illegible]VES, AND RUBBER APRON.

[illegible]HER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE
[illegible]ARBY AND READY FOR USE.

-------------------FIRE AND EXPLOSION INFORMATION-------------------

[illegible]SH POINT, DEG F: NOT FLAMMABLE	FLAMMABLE LIMITS IN AIR, %
METHOD USED: N/A	LOWER: N/A UPPER: N/A

[illegible]OIGNITION TEMPERATURE, DEG.F: NOT APPLICABLE

[illegible]TINGUISHING MEDIA: INITIALLY FLOOD WITH WATER. WATER OR CO2 MAY
[illegible]USED TO FIGHT FIRE.

[illegible]CIAL FIRE FIGHTING PROCEDURES: FIRE FIGHTERS SHOULD WEAR SELF-
[illegible]NTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. USE WATER
[illegible]RAY TO COOL NEARBY CONTAINERS AND STRUCTURES EXPOSED TO FIRE.

[illegible]SUAL FIRE AND EXPLOSION HAZARDS: MATERIAL IS AN OXIDIZING AGENT --
[illegible]CAN SUPPLY OXYGEN TO STIMULATE OR ACCELERATE COMBUSTION OF ORGANIC
[illegible] OTHER COMBUSTIBLE MATERIALS; THESE FIRES ARE DIFFICULT TO EXTINGUISH.
[illegible]VE 575 DEG F (310 DEG C), MATERIAL DECOMPOSES TO TOXIC NITROGEN OXIDE
[illegible]ES WHICH ARE ALSO OXIDIZERS. ABOVE ABOUT 1000 DEG F (538 DEG C) THIS
[illegible]ERIAL MAY EXPLODE.

-------------------------HAZARDOUS REACTIVITY-------------------------

[illegible]BILITY: STABLE, UNSTABLE WITH HEAT   POLYMERIZATION: WILL NOT OCCUR

[illegible]DITIONS TO AVOID: TEMPERATURES ABOVE 575 DEG F (310 DEG C).

[illegible]ERIALS TO AVOID: ACIDS, AMMONIA SALTS, AMINES, REDUCING AGENTS,
[illegible]ANIENE, PHTHALIC ACID, PHTHALIC ANHYDRIDE, SODIUM AMIDES, AMMONIA,
[illegible]MIDES, SODIUM THIOCYANATES, COMBUSTIBLE MATERIALS SUCH AS WOOD
[illegible] CHARCOAL OR ORGANIC MATERIALS.

[illegible]ARDOUS DECOMPOSITION PRODUCTS: WILL LIBERATE TOXIC, OXIDIZING
[illegible]ROGEN OXIDES. LEAVES CAUSTIC RESIDUE.

-------------------SPILL, LEAK, AND DISPOSAL PROCEDURES-------------------

[illegible] FOR SPILLS OR LEAKS: WEAR PROTECTIVE EQUIPMENT INCLUDING [illegible] GLOVES, RUBBER APRON, AND A SELF CONTAINED [illegible] APPARATUS IN THE PRESSURE DEMAND MODE OR A SUPPLIED-AIR [illegible]SPIRATOR. IF THE SPILL OR LEAK IS SMALL, A FULL FACEPIECE AIR-[illegible]RIFYING CARTRIDGE RESPIRATOR EQUIPPED WITH PARTICULATE FILTERS MAY BE [illegible]ATISFACTORY. IN ANY EVENT, ALWAYS WEAR EYE PROTECTION. FOR SMALL [illegible]ILLS, SWEEP UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR [illegible]ARGE SPILLS, SHOVEL INTO DOT-APPROVED WASTE CONTAINERS. KEEP OUT OF [illegible]EWERS, STORM DRAINS, SURFACE WATERS, AND SOIL.
[illegible]OMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING, [illegible]ND HANDLING AND DISPOSAL OF WASTE.

ISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED N CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. ONSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO SCERTAIN PROPER DISPOSAL PROCEDURES.
OTE: EMPTY CONTAINERS CAN HAVE RESIDUES, GASES AND MISTS AND ARE JBJECT TO PROPER WASTE DISPOSAL, AS ABOVE.

------------------------SPECIAL PRECAUTIONS------------------------

TORAGE AND HANDLING PRECAUTIONS: STORE IN A COOL, DRY, WELL-VENTILATED LACE. STORE AWAY FROM ALL OTHER CHEMICALS AND POTENTIAL SOURCES OF ONTAMINATION. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE. DO NOT SE PRESSURE TO EMPTY CONTAINER. WASH THOROUGHLY AFTER HANDLING. DO OT GET IN EYES, ON SKIN, OR ON CLOTHING.

EPAIR AND MAINTENANCE PRECAUTIONS: NONE.

THER PRECAUTIONS: CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, WILL ETAIN PRODUCT RESIDUE. ALWAYS OBEY HAZARD WARNINGS AND HANDLE EMPTY ONTAINERS AS IF THEY WERE FULL.

----------------------ECOLOGICAL INFORMATION SECTION----------------------

QUATIC TOXICITY
HE COMPOUND IS SLIGHTLY TOXIC. THE 96-HR LC50 IN MINNOWS IS > 100 MG/L

----------------------OTHER REGULATORY INFORMATION----------------------

ECTION 313: NONE

ROPOSITION 65: NONE

ECTION 313 & PROP. 65: NONE

ECTION 313 (WITH CHEMICALS LISTED): NONE

ROPOSITION 65 (WITH CHEMICALS LISTED): NONE

ASSACHUSETTS: NONE

ENNSYLVANIA: UNDER THE PENNSYLVANIA RIGHT-TO-KNOW LAW, HAZARDOUS UBSTANCES AND SPECIAL HAZARDOUS SUBSTANCES COMPONENTS PRESENT IN THIS RODUCT WHICH REQUIRE REPORTING ARE:

AZARDOUS SUBSTANCES

HEMICAL(S)	CAS NO.	CONCENTRATION (>1%)
ODIUM NITRITE	7632-00-0	99.7

ALIFORNIA SCAQMD: NONE

SCA: THE INGREDIENTS OF THIS PRODUCT ARE ON THE TSCA INVENTORY.

------------------------REVISION------------------------

?/86: ADDED PERSONNEL EXPOSURE LIMITS. EXPANDED EYE HAZARDS AND AG-RAVATED MEDICAL CONDITIONS. ADDED ANIMAL TOXICITY DATA. REVISED RES-IRATORY AND EYE PROTECTION, FIRE FIGHTING INFORMATION, MATERIALS TO VOID, SPILL AND LEAK PROCEDURES, AND HANDLING ADVICE.

[illegible]

[illegible]

[illegible]

[illegible]

...VIDED: SYNONYMS, BOILING POINT, TOXICITY (OTHER DATA)

----------------------------FOR ADDITIONAL INFORMATION----------------------------

CONTACT MSDS COORDINATOR, VAN WATERS & ROGERS INC.
DURING BUSINESS HOURS, PACIFIC TIME (408)435-8700

--NOTICE--

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**** E N D O F M S D S ****

...OD: 04656558 09:21:06 11 DEC 1990 CUST: 84090433 INVOICE: 841519860

* SWMU 5, 7, 8

AVGANIC INDUSTRIES INC.
RC 1,1,1 TRICHLOROETHANE VAPOR DEG.GRADE
0021
/90

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: RC 1,1,1 TRICHLOROETHANE VAPOR DEG.GRADE PAGE 1

DISTRIBUTED BY: AVGANIC INDUSTRIES INC.
114 NORTH MAIN STREET
COTTAGE GROVE,WI 53527
(608) 257-1414
24 HOUR EMERGENCY # - ( ) -
CHEMTREC EMERGENCY # - (800) 424-9300

MSDS#:AV901RC0021XX

PREPARED BY:NAO
08/27/90

MANUFACTURED BY: AVGANIC INDUSTRIES, INC.

SECTION I - PRODUCT INFORMATION

TRADE NAME: RC 1,1,1 TRICHLOROETHANE VAPOR DEG.GRADE
CHEMICAL NAME SYNONYMS: Methyl Chloroform

C.A.S. REGISTRY #: 71-55-6
CHEMICAL FAMILY: Chlorinated Hydrocarbon

FORMULA: CH3CCl3

D.O.T. PROPER SHIPPING NAME: 1-1-1 TRICHLOROETHANE

D.O.T. HAZARD CLASS: ORM A

D.O.T. IDENTIFICATION #: UN2831 D.O.T. LABEL: N.A.

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT	TLV LEVEL	PEL LEVEL
1,1,1-Trichloroethane	> 91%	350 ppm	350 ppm
Stabilizers	< 7%	Not Estab.	Not Estab.
Methylene Chloride	0-2%	50 ppm	*
1,2-Trichloro-1,2,2-Trifluoroethane	0-2%	1000 ppm	1000 ppm
Dichloroethylene	0-2%	50 ppm	50 ppm
Trichloroethylene	0-2%	50 ppm	25 ppm
Acetone	0-2%	750 ppm	750 ppm
Methyl Ethyl Ketone	0-2%	200 ppm	200 ppm
Toluene	0-2%	100 ppm	100 ppm
Cumene	0-1%	100 ppm	100 ppm
Methyl Isobutyl Ketone	0-1%	50 ppm	50 ppm
Butyl Acetate	0-1%	400 ppm	400 ppm

MATERIAL SAFETY DATA SHEET

SECTION II - HAZARDOUS INGREDIENTS

-Propyl Alcohol	0-1%	200 ppm-skin	200 ppm

NOTE : * Stabilizers commonly include: 1,2-Butylene Oxide, 1,4-Dioxane, sec-Butyl Alcohol, Nitromethane, 1-Nitropropane, and 1,3-Dioxolane. Other stabilizers which may also be present are t-Amyl Alcohol and t-Butyl Alcohol. This product is a variable blend. The compounds listed have been identified by analysis of a typical blend of the product.

SECTION III - PHYSICAL DATA

BOILING POINT (DEG. F): 165.4
FREEZING POINT (DEG.F): - 49
VAPOR PRESSURE (MM HG): 135 @ 25 C
VAPOR DENSITY (AIR=1) : 4.6
SOLUBILITY IN WATER: Negligible

SPECIFIC GRAVITY: 1.3
PERCENT VOLATILE BY VOLUME%: 100 %
EVAPORATION RATE(Ether): 0.4

APPEARANCE AND ODOR: Clear, colorless liquid. Ether-like odor.

SECTION IV - FIRE EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): None.

FLAMMABLE LIMITS **LEL:** 7 **UEL:** 15

EXTINGUISHING MEDIA: Water spray. Dry Chemical. Carbon Dioxide.

SPECIAL FIRE FIGHTING PROCEDURES: Evacuate area of unprotected personnel. Wear protective clothing including a NIOSH-Approved self-contained breathing apparatus. Cool fire-exposed containers with water spray. Run-off from fire control may cause pollution.

UNUSUAL FIRE EXPLOSION HAZARDS: Concentrated vapors can be ignited by high intensity heat source. Product may thermally decompose to produce Hydrogen Chloride vapors and possibly traces of Phosgene.

IC INDUSTRIES INC.
1,1,1 TRICHLOROETHANE VAPOR DEG.GRADE
0021
/90

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: RC 1,1,1 TRICHLORQETHANE VAPOR DEG.GRADE PAGE 3

SECTION IV - FIRE EXPLOSION HAZARD DATA

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: 350 ppm-TWA; 450 ppm-STEL (OSHA 29 CFR 1910.Z-1-A)
350 ppm-TWA; 450 ppm-STEL (ACGIH 1989-90)
*** Exposure Limits listed are the lowest values for the major constituents of the product.**

EFFECTS OF OVEREXPOSURE

EYE CONTACT: Short term liquid or vapor contact may result in slight irritation. Prolonged or repeated contact may be more irritating. Permanent eye damage may result.

SKIN CONTACT: May cause mild irritation to skin. Prolonged and repeated contact with skin can cause defatting and drying of the skin which may result in skin irritation and dermatitis.

INHALATION: High concentrations or prolonged exposure to lower concentrations may be slightly irritating to mucous membranes. Inhalation overexposure can lead to central nervous system depression producing effects such as headaches, nausea, dizziness and loss of consciousness. Extreme exposures may cause other central nervous system effects including death.

INGESTION: Liquid ingestion may result in vomiting; aspiration (breathing in of liquid into the lungs) must be avoided as liquid contact with the lungs can result in chemical pneumonitis and pulmonary edema/hemorrhage. Large amounts may be fatal.

OTHER: ROUTES OF EXPOSURE: Product can affect the body if it is inhaled, comes in contact with the eyes or skin, or is swallowed. MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute and chronic liver disease and rhythm disorders of the heart. TARGET ORGANS: Eyes. Skin. Cardiovascular System. Central Nervous System. Reports of animal test studies have shown that chronic overexposures

SECTION V - HEALTH HAZARD DATA

have caused liver toxic effects in experimental animals.

EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids open during this flushing with water. Call a physician immediately.

SKIN CONTACT: Flush area with water while removing contaminated clothing and shoes. Follow by washing with soap and water. Do not reuse clothing or shoes until cleaned. If irritation persists, get medical attention.

INGESTION: If conscious, drink a quart of water. DO NOT induce vomiting. CALL A PHYSICIAN immediately. If unconscious or in convulsions, take immediately to a hospital or a physician. NEVER induce vomiting or give anything by mouth to an unconscious victim.

INHALATION: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. CALL A PHYSICIAN. Do not give stimulants unless instructed to do so by a physician.

OTHER: ADDITIONAL NOTES TO PHYSICIAN: Chlorinated Solvent. Never administer adrenalin following overexposure. Increased sensitivity of the heart to adrenalin may be caused by overexposure to solvent.

SECTION VI - REACTIVITY DATA

STABILITY: X STABLE ___ UNSTABLE
CONDITIONS TO AVOID: Avoid contact with heat, sparks, electric arcs, other hot surfaces, and open flames.

INCOMPATABILITY: Strong Oxidizing Agents. Alkalies. Alkali metals (strong reducing metals such as Aluminum, Sodium, Potassium, etc.). Contact with aluminum parts in a pressurizable fluid system may

MATERIAL SAFETY DATA SHEET

SECTION VI - REACTIVITY DATA

cause violent reactions. Aluminum equipment should not be used for storage and/or transfer.

HAZARDOUS DECOMPOSITION PRODUCTS: May thermally decompose to form Carbon Monoxide, Carbon Dioxide, Hydrogen Chloride vapors, traces of Phosgene, and unidentifiable organic materials.

HAZARDOUS POLYMERIZATION: ___MAY OCCUR _X_WILL NOT OCCUR

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Eliminate all sources of ignition. Evacuate unprotected personnel from area. Maintain adequate ventilation. Use proper Safety Equipment. Contain spill, place into drums for proper disposal. Soak up residue with non-flammable absorbent material. Place in non-leaking containers for immediate disposal. Flush remaining area with water to remove trace residue and dispose of properly. Avoid direct discharge to sewers and surface waters. Notify authorities if entry occurs.

WASTE DISPOSAL METHOD: Observe all Local, State, and Federal Regulations. Dispose of at approved Waste Treatment Facility. Reclaim (recycle) solvent. DO NOT pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks or other sources of ignition.

SECTION VIII - SPECIAL PROTECTION INFORMATION

CONSULT SAFETY EQUIPMENT DISTRIBUTOR

RESPIRATORY PROTECTION: If recommended Exposure Limits are exceeded wear: NIOSH-Approved organic respirator. NIOSH-Approved self-contained breathing apparatus. Do not exceed limits established by the respirator manufacturer.

VENTILATION: Maintain adequate ventilation. Do not use in closed or confined space. Keep levels below recommended Exposure Limits. To

SECTION VIII - SPECIAL PROTECTION INFORMATION

determine exposure levels, monitoring should be performed regularly. Avoid mist formation.

PROTECTIVE GLOVES: Polyvinyl Alcohol.

EYE PROTECTION: Chemical Safety Goggles. Face shield. Do not wear contact lenses.

OTHER PROTECTIVE EQUIPMENT: Eye-wash station. Safety shower. Rubber apron. Chemical safety shoes. Protective clothing.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
Store in cool, well-ventilated area away from all sources of ignition and out of direct sunlight. Ground all equipment to prevent accumulation of static charge. Keep containers tightly closed. Store away from incompatable materials. Do not store in unlabeled or mislabeled containers.

OTHER PRECAUTIONS: Avoid contact with skin and eyes. Do not swallow. Use with adequate ventilation. Avoid prolonged or repeated breathing of vapors. Wash thoroughly after handling. Avoid dust or mist formation. Do not eat, drink, or smoke in work area.

SECTION X - SUPPLEMENTAL HEALTH INFORMATION

CARCINOGEN CONTENT

% PPM	INGREDIENT	IARC	NTP	OSHA
0-2%	Trichloroethylene	N	N	N
0-2%	Methylene Chloride	P	P	N
0-2%	Perchloroethylene	P	P	N

NOTE : N: Not listed as a known or potential carcinogen

MATERIAL SAFETY DATA SHEET

SECTION X - SUPPLEMENTAL HEALTH INFORMATION

in source's list. Trichloroethylene has been extensively studied for chronic effects in animals. While there are studies in which tumors were induced in mice, there is no evidence that trichloroethylene poses a carcinogenic risk to humans. P: Potential Carcinogen - Substances "which may reasonably be anticipated to be carcinogens" are defined as those for which there is a limited evidence of carcinogenicity in humans or sufficient evidence of carcinogenicity in experimental animals. Prolonged overexposure has caused toxic effects in the liver and kidneys of experimental animals and has caused cancer in certain laboratory animal tests. The International Agency for Research on Cancer (IARC) has concluded that there is sufficient evidence for the carcinogenicity of Methylene Chloride to experimental animals, and inadequate evidence for the carcinogenicity of Methylene Chloride to humans, resulting in a classification as a 2B animal carcinogen on the IARC list. The National Toxicology Program (NTP) has identified Methylene Chloride as an animal carcinogen. The American Conference of Governmental Hygienists (ACGIH) lists Methylene Chloride as an A2 - Suspected Human Carcinogen. Epidemiology studies of 751 humans chronically exposed to Methylene Chloride in the workplace of which 252 were exposed for a minimum of 20 years did not demonstrate any increase in deaths caused by cancer or cardiac problems. A second study of 2,227 workers confirmed these results. The International Agency for Research on Cancer (IARC) has concluded that that there is sufficient evidence for the carcinogenicity of Perchloroethylene to experimental animals, and inadequate evidence for the carcinogenicity of Perchloroethylene to humans, resulting in a classification as a 2B animal carcinogen on the IARC list. The National Toxicology Program (NTP) has identified Perchloroethylene as an animal carcinogen. Epidemiologic studies have been inconclusive in determining whether Perchloroethylene is associated with increased incidences of cancer in humans.

LD50 ORAL : Rat: 10300 mg/kg
LD50 SKIN : Rabbit: 500 mg/24H (Moderate irritation)
LC50 INHALATION : Rat LCLo: 1000 ppm

** ** ** ** ** ** ** ** ** ** **

MATERIAL SAFETY DATA SHEET

SECTION X - SUPPLEMENTAL HEALTH INFORMATION

data in this Material Safety Data Sheet relates only to the specific erial designated and does not relate to its use in combination with other material or process. The data contained is believed to be rect. However, since conditions of use are outside our control it uld not be taken as a warranty or representation for which AVGANIC USTRIES INC. assumes legal responsibility. This information is provided ely for your consideration, investigation, and verification.

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MATERIAL SAFETY DATA SHEET

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor "Essentially Similar" to Form OSHA 20)

FOR CHEMICAL EMERGENCY
SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT
CALL CHEMTREC - DAY OR NIGHT
800-424-9300

Section I

MANUFACTURER'S NAME StanChem, Inc.

DATE OF PREP 1/85

STREET ADDRESS 401 Berlin Street

CITY, STATE, AND ZIP CODE E. Berlin, Ct. 06023

EMERGENCY TELEPHONE NO / INFORMATION TELEPHONE NO (203) 828-0571 or 828-0572

PRODUCT CLASS Solvent - Solution Polymer

MANUFACTURER'S CODE IDENTIFICATION 7013

TRADE NAME StanChem 7013

Section II—HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT	OCCUPATIONAL EXPOSURE LIMITS	VAPOR PRESSURE	TOXICITY DATA
Acrylic Polymer	40%	NOT ESTABLISHED		
Residual Monomer	2.0			
Methyl Ethyl Ketone	60.0%	200 ppm		

Section III—PHYSICAL DATA

BOILING RANGE 79C/175°F

VAPOR DENSITY ☒ HEAVIER ☐ LIGHTER THAN AIR

EVAPORATION RATE ☐ FASTER ☒ SLOWER THAN ETHER

PERCENT VOLATILE BY VOLUME 60%

WEIGHT PER GALLON 8.8 ± 0.1 lbs.

Section IV—FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION OSHA Flammable Liquid DOT Flammable Liquid

FLASH POINT 25°F TCC

LEL

EXTINGUISHING MEDIA

☐ FOAM ☒ "ALCOHOL" FOAM ☒ CO_2 ☒ DRY CHEMICAL ☒ WATER FOG ☐ OTHER

UNUSUAL FIRE AND EXPLOSION HAZARDS

Wear MSHA/NIOSH approved, pressure-demand, self contained breathing apparatus with full protective equipment. Cool fire-exposed containers with water spray. High pressure solid stream of water will spread the fire.

Produts of combustion are Oxides of carbon. Solvent vapors can travel to an ignition source and flash back. Explosive mixtures can form with air.

Section V—HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE Inhalation: Solvent vapors or spray mists can cause headaches, nausea, dizziness and irritation of the nose, throat and lungs.
Skin Contact: Prolonged or repeated contact with product can cause irritation. Eye Contact: Direct contact can cause eye irritation and temporary eye damage.

Ingestion: If conscious, give two glasses of water to drink, call a physician. Do not give anything by mouth to unconscious person.
Eye Contact: Direct contact can cause eye irritation and temporary eye damage. Inhalation
EMERGENCY AND FIRST AID PROCEDURES Remove subject to fresh air. Eye and skin contact: Immediately wash with plenty of water for at least 15 minutes and see a physician if irritation occurs; wash skin thoroughly with soap and water. Remove and wash contaminated clothing.

Section VI—REACTIVITY DATA

STABILITY ☐UNSTABLE ☐STABLE CONDITIONS TO AVOID N/A
INCOMPATIBILITY (Materials to avoid)
HAZARDOUS DECOMPOSITION PRODUCTS N/A

HAZARDOUS POLYMERIZATION ☐MAY OCCUR ☐WILL NOT OCCUR

Section VII—SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Remove all sources of ignition. Wear MSHA/NIOSH approved respirator. Pressure-demand, self-contained breathing appatus is preferred. Dike and contain spill with inert material and transfer liquid and solid separately to containers for recovery and disposal.
WASTE DISPOSAL METHOD For discard this is a hazardous waste. Reportable quantity is one pound. In accordance with local, state and federal regulations, incinerate liquid in approved equipment. Landfill contaminated diking material with due regard for low flash point of solvent.

Section VIII—SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION None required if good ventilation is maintained. Otherwise wear MSHA/NIOSH type respirator suitable for vapor concentrations encountered.

VENTILATION Explosion-proof local exhaust at point of vapor or mist release.

PROTECTIVE GLOVES Impervious OTHER PROTECTIVE EQUIPMENT Eyewash, shower
EYE PROTECTION Splashproof safety goggles

Section IX—SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

OTHER PRECAUTIONS Store containers in approved areas for flammables. Ground all containers prior to pouring. Exposure to high vapor concentration can occur when transferring material from container to container.

*SUMMS 9,10,

P1359 MATERIAL SAFETY DATA SHEET PG 1

NICKEL SULFAMATE 20 OZ CONC REVISION DT:01-06-90

SHIP TO:

84090488
CMW INC
70 GRAY ST.
PO BOX 2266
INDIANAPOLIS IN 46206

ORDER NO: 841518755
PROD NO: 04436507

VAN WATERS & ROGERS INC., SUBSIDIARY OF UNIVAR
1600 NORTON BLDG. SEATTLE, WA 98104-1564 (408) 435-8700

EMERGENCY ASSISTANCE

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL CHEMTREC (800)424-9300

FOR PRODUCT AND SALES INFORMATION

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE

PRODUCT IDENTIFICATION

PRODUCT NAME: NICKEL SULFAMATE
COMMON NAMES/SYNONYMS: NICKEL SULFAMATE
CAS NO.: MIXTURE
VW&R CODE: P1359

FORMULA: MIXTURE
HAZARD RATING (NFPA 704)
HEALTH: 3
FIRE: 0
REACTIVITY: 0
SPECIAL: NONE

DATE ISSUED: 08/89
SUPERCEDES: 07/89
HAZARD RATING SCALE:
0=MINIMAL 3=SERIOUS
1=SLIGHT 4=SEVERE
2=MODERATE

HAZARDOUS INGREDIENTS

COMPONENT	CAS NO.	%	EXPOSURE LIMITS, MG/M3 OSHA PEL	ACGIH TLV	OTHER LIMIT	HAZARD
NICKEL SULFAMATE	13770-87-3	48, 52	1 (NI)	0.1 (NI)	0.015 (NI)(NIOSH)	TOXIC; IRRITANT
WATER	7732-18-5	BALANCE	NONE	NONE	NONE	NONE

PHYSICAL PROPERTIES

BOILING POINT, DEG F: NOT AVAIL. VAPOR PRESSURE, MM HG/20 DEG C: N/A
MELTING POINT, DEG F: N/A VAPOR DENSITY (AIR=1): N/A
SPECIFIC GRAVITY (WATER=1): 1.47-1.5 WATER SOLUBILITY, %: 100
APPEARANCE AND ODOR: BLUE-GREEN LIQUID; ODORLESS EVAPORATION RATE (BUTYL ACETATE=1): N/A

FIRST AID MEASURES

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING WATER FOR 15 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF SKIN CONTACT: IMMEDIATELY WASH SKIN WITH LOTS OF SOAP AND WATER. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH BEFORE REUSE. GET MEDICAL ATTENTION IF IRRITATION PERSISTS AFTER WASHING.

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IF SWALLOWED: IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING BY GIVING 2 GLASSES OF WATER AND STICKING A FINGER DOWN THE THROAT. GET IMMEDIATE MEDICAL ATTENTION. DO NOT GIVE ANYTHING TO AN UNCONSCIOUS OR CONVULSING PERSON.

----------HEALTH HAZARD INFORMATION----------

PRIMARY ROUTES OF EXPOSURE: SKIN OR EYE CONTACT

SIGNS AND SYMPTOMS OF EXPOSURE

INHALATION: INHALATION CAUSES RESPIRATORY IRRITATION. INDIVIDUALS HYPERSENSITIVE TO NICKEL MAY DEVELOP ASTHMA, BRONCHITIS, SHORTNESS OF BREATH OR WHEEZING.

EYE CONTACT: LIQUID AND MIST WILL IRRITATE THE EYES.

SKIN CONTACT: SKIN CONTACT CAUSES IRRITATION AND SENSITIZATION OR ALLERGIC REACTIONS WHICH MAY BE ACCENTUATED BY HEAT AND HUMIDITY.

SWALLOWED: SWALLOWING LARGE QUANTITIES MAY CAUSE NAUSEA, VOMITING AND DIZZINESS.

CHRONIC EFFECTS OF EXPOSURE: SENSITIZATION OR ALLERGIC REACTIONS AND RESPIRATORY DISORDERS MAY RESULT FROM PROLONGED EXPOSURE TO NICKEL COMPOUNDS. INSOLUBLE NICKEL COMPOUNDS, WHEN INHALED, ARE SUSPECTED BY SOME SCIENTISTS OF CONTRIBUTING TO THE DEVELOPMENT OF CANCER IN HUMANS. SOLUBLE NICKEL COMPOUNDS, SUCH AS NICKEL SULFAMATE, ARE NOT CONSIDERED IN THE SAME CLASS.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE REPORTED.

----------TOXICITY DATA----------

ORAL: NO DATA FOUND

DERMAL: NO DATA FOUND

INHALATION: NO DATA FOUND

CARCINOGENICITY: THIS MATERIAL IS NOT CONSIDERED TO BE A CARCINOGEN BY THE NATIONAL TOXICOLOGY PROGRAM, THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, OR THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OTHER DATA: NICKEL IS CONSIDERED TO BE AN ANIMAL TERATOGEN.

----------PERSONAL PROTECTION----------

VENTILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MAINTAINING EMISSIONS AT THE POINT OF USE BELOW THE PEL.

RESPIRATORY PROTECTION: WEAR A NIOSH-APPROVED RESPIRATOR APPROPRIATE FOR THE VAPOR OR MIST CONCENTRATION AT THE POINT OF USE. APPROPRIATE RESPIRATORS MAY BE A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CARTRIDGE RESPIRATOR EQUIPPED FOR ORGANIC VAPORS/MISTS, A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE, OR A SUPPLIED-AIR RESPIRATOR.

EYE PROTECTION: CHEMICAL GOGGLES UNLESS A FULL FACEPIECE RESPIRATOR IS ALSO WORN. IT IS GENERALLY RECOGNIZED THAT CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH CHEMICALS BECAUSE CONTACT LENSES MAY CONTRIBUTE TO THE SEVERITY OF AN EYE INJURY.

PROTECTIVE CLOTHING: LONG-SLEEVED SHIRT, TROUSERS, SAFETY SHOES, RUBBER GLOVES, AND RUBBER APRON.

OTHER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE NEARBY AND READY FOR USE.

----------FIRE AND EXPLOSION INFORMATION----------

FLASH POINT, DEG F: NOT FLAMMABLE FLAMMABLE LIMITS IN AIR, %

PROD: 04436507 14:56:18 28 NOV 1990 CUST: 84090433 INVOICE: 841518755

FMC

MATERIAL SAFETY DATA 7727 54 0

AMMONIUM PERSULFATE

NFPA Designation 704

DEGREE OF HAZARD
4 = EXTREME
3 = HIGH
2 = MODERATE
1 = SLIGHT
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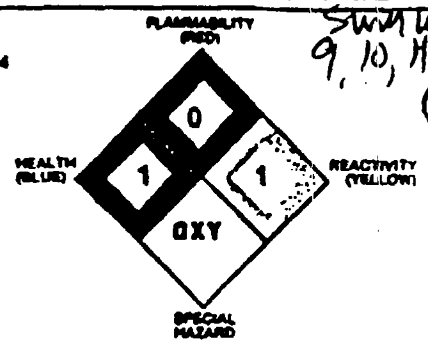

SWMUS 9, 10, 11

EMERGENCY TELEPHONE NUMBERS
MEDICAL (303) 595-9048 CALL COLLECT
CHEMTREC (800) 424-9300
OTHER (716) 876-8300 CALL COLLECT

REVISION: EFFECTIVE: 01/10/86 PRINTED: 01/20/86

TRANSPORTATION DATA

DOT PROPER SHIPPING NAME.:	AMMONIUM PERSULFATE
DOT CLASSIFICATION........:	OXIDIZER
DOT LABELS.................:	OXIDIZER
DOT MARKING................:	AMMONIUM PERSULFATE UN 1444
DOT PLACARD................:	OXIDIZER
UN NUMBER..................:	1444
HAZARDOUS SUBSTANCE/RQ...:	NOT LISTED
49 STCC NUMBER............:	4918733
EMERGENCY ACCIDENT PRECAUTIONS AND PROCEDURE:	WASH AREA WITH LARGE AMOUNTS OF WATER.
PRECAUTIONS TO BE TAKEN..: IN TRANSPORTATION	KEEP MATERIAL COOL AND DRY.
CMA CHEMCARD NUMBER.......:	NONE
TYPE PACKAGES.............:	225 LB. FIBRE DRUM DOT 21C250 W/ POLYLINER 55 LB. POLY BAG DOT 44P 1000-2000 LB. IBC DOT EXEMPTION E8489
OTHER SHIPPING IDS.......:	

ADDITIONAL REGULATORY INFORMATION

MATERIAL IS REPORTED IN EPA TSCA INVENTORY LIST?	YES
MATERIAL IS LISTED AS A CARCINOGEN/POTENTIAL CARCINOGEN IN FOLLOWING	
NTP ANNUAL REPORT... ?	NO
IARC MONOGRAPHS..... ?	NO
OSHA 29CFR PART 1910 SUBPART Z ?	NO

ADDITIONAL INFORMATION

AQUATIC TOXICITY CLASSIFICATION - NIOSH RTECS NO. 79-100
EFFECTS OF LOW CONCENTRATION ON AQUATIC LIFE NOT DETERMINED.

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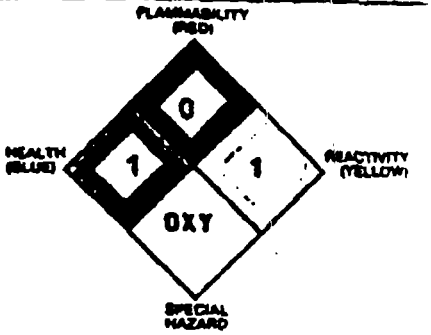

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	STORAGE AND HANDLING	
(PLEASE USE THIS STATEMENT TO SATISTY THE IN-PLANT LABELING REQUIREMENTS OF THE OSHA HAZARD COMMUNICATIONS STANDARD 29CFR 1910.1200)	STORE (UNOPENED) IN A COOL, CLEAN, DRY PLACE AND AWAY FROM POINT SOURCE HEAT I.E. RADIENT HEATERS OR STEAM PIPES. USE FIRST IN FIRST OUT STORAGE SYSTEM. AVOID CONTAMINATION OF OPENED PRODUCT. AVOID PROLONGED OR REPEATED SKIN CONTACT USING GOOD PERSONAL HYGIENE. IN CASE OF FIRE OR DECOMPOSITION CONDITIONS (SMOKING) USE SELF-CONTAINED BREATHING APPARATUS WITH FULL FACE PIECE, ACID RESISTANT CLOTHING AND DELUGE WITH PLENTY OF WATER TO CONTROL DECOMPOSITION. FOR STORAGE REQUIREMENTS, REFER TO THE NFPA BULLETIN 43A ON THE STORAGE OF LIQUID AND SOLID OXIDIZING MATERIALS. NFPA HAZARD CLASS 1 OXIDIZER IMCO HAZARD CLASS 5.1 OXIDIZER.	
	DISPOSAL, SPILL OR LEAK PROCEDURES	
PROCEDURE FOR RELEASE....: OR SPILL	MATERIAL SHOULD BE PUT INTO AN APPROVED DOT CONTAINER THEN DILUTED WITH LARGE QUANTITY OF WATER AND DISPOSED OF ACCORDING TO THE METHODS OUTLINED BELOW FOR WASTE DISPOSAL.	
WASTE DISPOSAL METHOD....:	AN ACCEPTABLE METHOD OF DISPOSAL IS TO DISSOLVE IN WATER AND DISPOSE VIA A TREATMENT SYSTEM IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL ENVIRONMENTAL LAWS, RULES, REGULATIONS, STANDARDS AND OTHER REQUIREMENTS. BECAUSE ACCEPTABLE METHODS OF DISPOSAL MAY VARY BY LOCATION, AND BECAUSE REGULATORY REQUIREMENTS MAY CHANGE, THE APPROPRIATE REGULATORY AGENCIES SHOULD BE CONTACTED PRIOR TO DISPOSAL.	
SCD		PAGE 05

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AMMONIUM PERSULFATE

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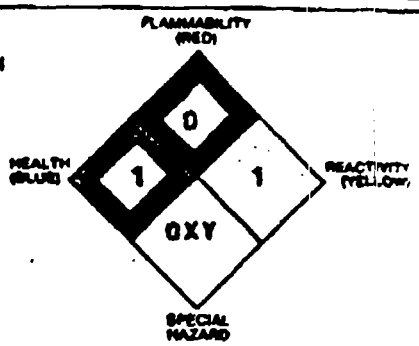

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==========	EMERGENCY AND FIRST AID PROCEDURES ==========	
INHALATION.....	REMOVE SUBJECT TO FRESH AIR. IF DISCOMFORT OCCURS AND PERSISTS OBTAIN MEDICAL ATTENTION.	
INGESTION.....	DRINK PLENTY OF WATER. CALL PHYSICIAN.	
DECONTAMINATION PROCEDURE:	WASH THOROUGHLY WITH SOAP AND WATER.	
NOTES TO PHYSICIAN.....	ASSIDE FROM ALLERGIC REACTIONS SUCH AS DERMATITIS AND ASTHMA REPORTED IN ONE CASE ONLY, EXPOSURE PROBLEMS ARE RELATED TO THE OXIDIZING PROPERTIES AND RESEMBLE, AND ARE TREATED LIKE, THOSE CAUSED BY STRONG ACIDS. HOWEVER, ATTEMPTS TO NEUTRALIZE WITH BASIC OR HALIDE-CONTAINING MATERIALS SHOULD BE AVOIDED BECAUSE OF POSSIBLE EXOTHERMIC REACTION. FLOODING OF EXPOSURE AREAS WITH WATER IS SUGGESTED, BUT GASTRIC LAVAGE OR EMESIS INDUCTION FOR INGESTIONS MUST CONSIDER THE POSSIBLE AGGRAVATION OF ESOPHAGEAL INJURY AND THE EXPECTED ABSENCE OF SYSTEM EFFECTS. DEMULCENTS MAY BE HELPFUL. TREATMENT OTHERWISE IS SUPPORTIVE AND SYMPTOMATIC.	
==========	SPECIAL PROTECTION ==========	
VENTILATION REQUIREMENTS.:	USE ONLY IN WELL VENTILATED AREA. CONTROL DUST IN WORK PLACE AREA AT OR BELOW PROPOSED TLV (5MG/M3 AS S2O8 FOR 8 HRS.)	
RECOMMENDED PERSONAL.....: PROTECTIVE EQUIPMENT		
RESPIRATORY.....:	WHEN EXPOSURE ABOVE THE ESTABLISHED STANDARD IS LIKELY, A RESPIRATORY PROTECTION PROGRAM WHICH COMPLIES WITH OSHA GENERAL INDUSTRY STANDARD 1910.134(E) AND RESPIRATORY EQUIPMENT, SUCH AS A DUST MASK APPROVED BY NIOSH/MESA SHOULD BE IMPLEMENTED.	
EYES.....:	EYE PROTECTION, SUCH AS CHEMICAL TYPE GOGGLES OR FACE MASK, SHOULD BE WORN WHENEVER SPLASHING, SPRAYING OR OTHER EYE CONTACT IS LIKELY.	
GLOVES.....:	GENERAL PURPOSE NEOPRENE GLOVES ARE RECOMMENDED.	
SPECIAL CLOTHING..: AND EQUIPMENT	NEOPRENE SHOES ARE RECOMMENDED.	
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MATERIAL SAFETY DATA 7727 S4 0

AMMONIUM PERSULFATE

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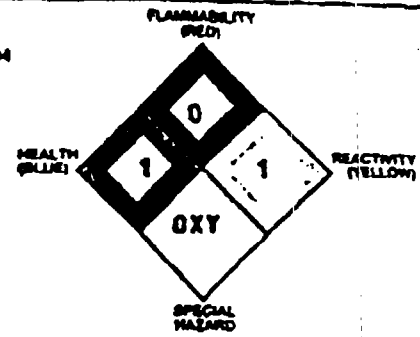

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ROUTES OF EXPOSURE

		SOURCE	DATE
EYE CONTACT	NON-IRRITATING (RABBIT) REF. ICG/79.025	FMC	1979
SKIN CONTACT	NON-IRRITATING (RABBIT) MAY BE SENSITIZER TO ALLERGIC PERSONS. REF.ICG/T.79.025	FMC	1979
SKIN ABSORPTION	NO SIGNIFICANT HAZARD. LD50 ABOVE 10G/KG (RABBIT) REF. ICG/T.79.025	FMC	1979
INHALATION	NO SIGNIFICANT HAZARD	ACGIH	1985-6
	PROPOSED TLV 5MG/M3 AS S208 FOR 8 HRS. TWA	FMC	1979
	1 HR. LC50 = 520 MG/L (RAT) REF.ICG/T.79.025		
INGESTION	SLIGHTLY HAZARDOUS LD50 =600 MG/KG (RAT) REF. ICG/T.79.025	FMC	1979

EXPOSURE LIMITS

	SOURCE	DATE
TLV 5 MG/M3 AS S208 FOR 8 HRS.	ACGIH	1985-6

EFFECTS OF OVEREXPOSURE

ACUTE EXPOSURE: DUST MAY BE HARMFUL AND IRRITATING. MAY BE HARMFUL IF SWALLOWED.

CHRONIC EXPOSURE: ALLERGIC PERSONS MAY DEVELOP DERMATITIS AND ASTHMA. REF. RESPIRATION 38:144 (1979).

EMERGENCY AND FIRST AID PROCEDURES

EYES: WASH THOROUGHLY WITH WATER. IF IRRITATION OCCURS AND PERSISTS, SEE AN OPHTHALMOLOGIST.

SKIN: WASH THOROUGHLY WITH WATER. IF IRRITATION OCCURS AND PERSISTS, OBTAIN MEDICAL ATTENTION.

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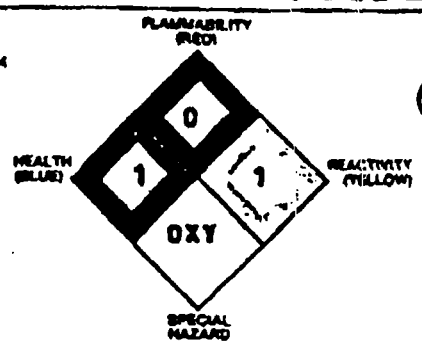
MATERIAL SAFETY DATA 7727 54 0

NFPA Designation 704



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	PHYSICAL DATA
MELTING POINT	DECOMPOSES
BOILING POINT	NOT APPLICABLE
VAPOR PRESSURE	NONE
VAPOR DENSITY (AIR = 1)	NONE
ROOM TEMPERATURE APPEARANCE AND STATE	LIGHT STRAW COLOR CRYSTALLINE POWDER
ODOR	ODORLESS
SPECIFIC GRAVITY (H2O =1)	APPRCX. 1.982
SOLUBILITY IN H2O % BY WT	44%
% VOLATILES BY VOLUME	NOT APPLICABLE
EVAPORATION RATE (BUTYL ACETATE = 1)	NOT APPLICABLE
PH (AS IS)	NOT APPLICABLE
PH (1% SOLUTION)	4.0 - 5.0
	FIRE, EXPLOSION AND REACTIVITY DATA
FLASH POINT	NONCOMBUSTIBLE
AUTOIGNITION TEMPERATURE	NONCOMBUSTIBLE
FLAMMABLE LIMITS UPPER	NOT APPLICABLE
(AIR) LOWER	NOT APPLICABLE
EXTINGUISHING MEDIA	DELUGE WITH WATER
SPECIAL FIREFIGHTING PROCEDURES	NONCOMBUSTIBLE - CONSIDER MATERIAL AS A STRONG OXIDIZER WITH ACIDIC MIST ALSO BEING PRESENT.
DEGREE OF FIRE AND EXPLOSION HAZARD	DECOMPOSES WITH THE LIBERATION OF OXYGEN. PRESENCE OF MOISTURE ACCELERATES DECOMPOSITION.
STABILITY	UNSTABLE; DECOMPOSES WITH EXOTHERMIC REACTION
HAZARDOUS POLYMERIZATION	WILL NOT OCCUR
CONDITIONS TO AVOID	HEAT, MOISTURE, REDUCING AGENTS.
MAJOR CONTAMINANTS THAT CONTRIBUTE TO INSTABILITY	HEAT, MOISTURE, REDUCING AGENTS
INCOMPATIBILITY	ACIDS, ALKALIS, HALIDES (FLUORIDES, CHLORIDES, BROMIDES), COMBUSTIBLE MATERIALS, HEAVY METALS.
HAZARDOUS DECOMPOSITION PRODUCTS	FUMES OF SULFURIC ACID MIST, OXYGEN WHICH SUPPORTS COMBUSTION AND OXIDES OF SULPHUR.

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AMMONIUM PERSULFATE

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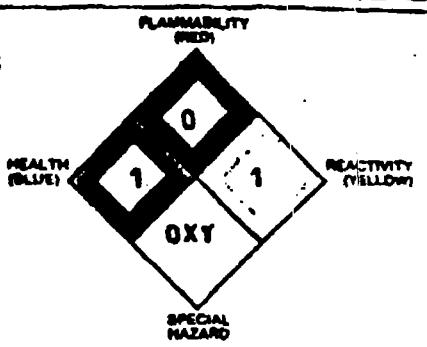

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REVISION:	EFFECTIVE: 01/10/86 PRINTED: 01/20/86
PREPARED FOR USE BY.....	ULRICH CHEMICAL INC 3111 N. POST ROAD INDIANAPOLIS IN 46226-651
==========	IDENTIFICATION ==========
INFORMATION PROVIDED BY..:	FMC CORPORATION 2000 MARKET STREET PHILADELPHIA, PA 19103
==========	PRODUCT INFORMATION ==========
SYNONYMS.....:	DIAMMONIUM PEROXYDISULFATE
SHIPPING NAME - DOT.....:	AMMONIUM PERSULFATE OXIDIZER
IATA.....:	AMMONIUM PERSULPHATE OXIDIZER
IMCO.....:	AMMONIUM PERSULPHATE OXIDIZER
FORMULA.....:	(NH4)2S2O8
CHEMICAL FAMILY.....:	PEROXYGEN
==========	PRECAUTIONARY INFORMATION. ==========
PRECAUTIONARY STATEMENT..: (PLEASE USE THIS STATEMENT TO SATISFY THE IN-PLANT LABELING REQUIREMENTS OF THE OSHA HAZARD COMMUNICATIONS STANDARD 29CFR 1910.1200)	HEALTH: AIRBORNE DUST MAY BE IRRITATING TO EYES, NOSE, THROAT AND SKIN UPON CONTACT. CONTINUOUS CONTACT MAY PRODUCE SKIN DERMATITIS. INHALATION OF AIRBORNE DUST AT HIGH LEVELS MAY PRODUCE SHORTNESS OF BREATH IN ALLERGIC PERSONS. PHYSICAL: DECOMPOSES IN STORAGE UNDER CONDITIONS OF EXCESSIVE HEAT AND OR MOISTURE (WATER, WATER VAPOR) CAUSING RELEASES OF OXIDES OF SULPHUR, DENSE MIST OF SULPHURIC ACID AND OXYGEN WHICH SUPPORTS COMBUSTION. REACTS WITH ACIDS, ALKALIS, HALIDES, COMBUSTABLE AND HEAVY METALS TO RELEASE OXYGEN.
==========	INGREDIENTS ==========
CAS# AND COMPONENT.....:	MATERIAL/COMPONENT: DIAMMONIUM PEROXYDISULFATE PERCENT.....: 100% CAS # .....: 7727-54-0 HAZARD CLASS.....: OXIDIZER
SCD	PAGE 01

JUN 19 '91 02:30 PHILIPP BROS CHEM.-N.J.

SWMUs 9, 10, 11

)S 2040 MATERIAL SAFETY DATA SHEET PAGE 1

EMICALS, INC.
KER PLAZA, SUITE 1400
T LEE, N.J. 07024
)3)944-6020

EMERGENCY MEDICAL INFO.:
(803)481-8528
TRANSPORTATION EMERGENCY:
CHEMTREC- (800)424-9300

E : 6/20/90 SUPERSEDES :

PRODUCT IDENTIFICATION

********** N.F.P.A. **********	
DEGREE OF HAZARD	EMERGENCY HAZARD RATING
4 = EXTREME	HEALTH < 4 >
3 = HIGH	FIRE < 1 >
2 = MODERATE	REACTIVITY < 2 >
1 = SLIGHT	SPECIFIC HAZARD < >
0 = INSIGNIFICANT	

FORMULA CAS NO.: 151-50-8

TRADE NAME: POTASSIUM CYANIDE

FORMULA: KCN MOLECULAR WT.: 65.12(ANHY)
SYNONYMS: POTASSIUM CYANIDE SOLID

HAZARDOUS INGREDIENTS

INGREDIENTS (CAS NO.)	WT PCT (APPROX)	PEL MG/M3	PEL PPM	TLV(TWA) MG/M3	TLV(TWA) PPM
POTASSIUM CYANIDE (151-50-8)	95	5(CN)		5(CN)	

NE: NOT ESTABLISHED

THE TLV'S ARE GIVEN FOR GUIDANCE; LOCAL APPLICABLE REGULATIONS SHOULD ALWAYS BE FOLLOWED. INGREDIENTS ARE THOSE PRESENT AT 1% OR GREATER, OR AT 0.1% OR GREATER IF LISTED AS POTENTIAL CARCINOGENS BY OSHA/IARC/NTP. PROPRIETARY INGREDIENT IDENTITIES ARE AVAILABLE IN ACCORDANCE WITH 29 CFR 1910.1200.
CARCINOGEN: NTP - NO; IARC - NO; OSHA - NO

PHYSICAL AND CHEMICAL CHARACTERISTICS

NA = NOT APPLICABLE, NE = NOT ESTABLISHED, D = DECOMPOSES

BOILING POINT, 760 MM HG (DEG C):	1625 C
MELTING/FREEZING POINT (DEG C):	635 C
SPECIFIC GRAVITY (WATER = 1):	CA 1.5
VAPOR PRESSURE (MM HG):	NOT FOUND
VAPOR DENSITY (AIR = 1):	NOT FOUND
WATER SOLUBILITY (% BY WT):	APPRECIABLE
VOLATILES (% BY WT):	NA
EVAPORATION RATE (BUTYL ACETATE = 1):	NOT FOUND
PH OF SOLUTION:	11.0 (0.1 N)

APPEARANCE/ODOR: WHITE GRANULAR SOLID, WITH A BITTER ALMOND ODOR. DO NOT SMELL - TOXIC

PHYSICAL HAZARD DATA

POTASSIUM CYANIDE IS NOT COMBUSTIBLE, BUT IF IN CONTACT WITH STRONG ACID WILL RELEASE POISONOUS AND FLAMMABLE HYDROGEN CYANIDE GAS.

FLASH POINT (DEG C): NA TEST METHOD: NA
FLAMMABLE LIMITS (% BY VOL): NA
AUTOIGNITION TEMP. (DEG C): NA

EXTINGUISHING MEDIA: ANY SUITABLE MEANS TO EXTINGUISH SURROUNDING FIRE. USE ALKALINE DRY CHEMICAL. DO NOT USE CARBON DIOXIDE OR OTHER ACIDIC TYPE EXTINGUISHERS. AVOID FLUSHING TO SEWER.

SPECIAL FIRE FIGHTING PROCEDURES: USE SPECIAL BREATHING EQUIPMENT AND PROTECTIVE CLOTHING APPROPRIATE TO THE SURROUNDING FIRE.

UNUSUAL FIRE OR EXPLOSION HAZARDS: NOT CONSIDERED AN EXPLOSION HAZARD, BUT CHLORATES, NITRITES AND NITROGEN TRICHLORIDE PLUS AMMONIA HAVE BEEN FOUND TO FORM EXPLOSIVE MIXTURES (SOME SPONTANEOUS) WHEN CONTACTED WITH POTASSIUM CYANIDE. WHEN FIGHTING NEARBY FIRE, DO NOT FLUSH INTO WATER COURSE OR INTO AREA WHERE POTASSIUM CYANIDE MIGHT MIX WITH STRONG ACID, AND RELEASE POISONOUS AND FLAMMABLE HYDROGEN CYANIDE (HCN) GAS.

NA: NOT APPLICABLE

REACTIVITY DATA

THERMAL STABILITY: STABLE AT ROOM TEMPERATURE IN TIGHTLY CLOSED CONTAINERS. POTASSIUM CYANIDE IS DELIQUESCENT. IT IS GRADUALLY DECOMPOSED ON EXPOSURE TO AIR BY REACTION WITH CARBON DIOXIDE, OXYGEN, AND MOISTURE.

INCOMPATIBILITY: NITROGEN TRICHLORIDE, PERCHLORYL FLUORIDE, SODIUM NITRITE, ACIDS, ALKALOIDS, CHLORAL HYDRATE, IODINE, STRONG OXIDIZERS.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

HAZARDOUS DECOMPOSITION PRODUCTS: THERMAL DECOMPOSITION OR ACIDIFICATION RELEASES TOXIC AND FLAMMABLE HYDROGEN CYANIDE GAS. MAY ALSO RELEASE OXIDES OF NITROGEN.

HEALTH HAZARD INFORMATION

EFFECTS OF OVEREXPOSURE:

SYMPTOMS OF INGESTION: TOXIC! FATAL! MAY CAUSE NAUSEA, VOMITING, RAPID RESPIRATION, HEADACHE, RAPID PULSE, WEAKNESS, DIZZINESS, CONFUSION, LOSS OF CONSCIOUSNESS.

SYMPTOMS OF INHALATION: CORROSIVE TO THE RESPIRATORY TRACT. THE SUBSTANCE INHIBITS CELLULAR RESPIRATION. OVEREXPOSURE MAY CAUSE HEADACHE, WEAKNESS, DIZZINESS, LABORED BREATHING AND NAUSEA WHICH CAN BE FOLLOWED BY WEAK CONVULSIONS, COMA AND DEATH.

SYMPTOMS OF SKIN CONTACT: CORROSIVE TO THE SKIN. SYMPTOMS INCLUDE IRRITATION, REDNESS, AND PAIN. POISONING FROM ABSORPTION THROUGH INJURED SKIN.

SYMPTOMS OF EYE CONTACT: CORROSIVE TO THE EYES. SYMPTOMS MAY INCLUDE IRRITATION, REDNESS, PAIN, DISCOLORATION, AND DAMAGE.

CHRONIC EXPOSURE: PROLONGED OR REPEATED SKIN EXPOSURE MAY CAUSE DERMATITIS. MAY AGGRAVATE OTHER PRE-EXISTING DISORDERS, TO INCLUDE DERMATITIS, CONJUNCTIVITIS, RESPIRATORY DISEASES, ALLERGIES, ANOXIA OR ANEMIA, NERVOUS DISORDERS.

ACUTE EXPOSURE CAN BE FATAL.

TOXICITY DATA:

ORAL TOXICITY:	LD50:	10 MG/KG, RAT
	LDLO:	3800 UG/KG, DOG
SUBCUTANEOUS TOXICITY:	LD50:	5 MG/KG, MOUSE
	LDLO:	60 MG/KG, FROG

EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: IMMEDIATELY, FLUSH WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE HOLDING EYELIDS APART. WASHING WITHIN ONE

MINUTE IS ESSENTIAL TO ACHIEVE MAXIMUM EFFECTIVENESS. GET IMMEDIATE MEDICAL ATTENTION AFTER FLUSHING.

SKIN CONTACT: WASH AFFECTED AREA THOROUGHLY WITH WATER. REMOVE CONTAMINATED CLOTHING AND LAUNDER WITH ALKALINE BLEACH BEFORE REUSE. IF IRRITATION SHOULD DEVELOP, GET MEDICAL ATTENTION.

INHALATION: BREAK AN AMYL NITRITE PEARL IN A CLOTH AND HOLD LIGHTLY UNDER NOSE FOR 15 SECONDS. REPEAT 5 TIMES AT ABOUT 15 SECOND INTERVALS. REPEAT AS NECESSARY USING A FRESH AMYL NITRITE PEARL EVERY 3 MINUTES UNTIL 3 OR 4 PEARLS HAVE BEEN GIVEN. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION, IF BREATHING IS DIFFICULT, GIVE OXYGEN. CALL A PHYSICIAN.

INGESTION: NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. INDUCE VOMITING IMMEDIATELY BY GIVING PATIENT ONE PINT OF 1% SODIUM THIOSULFATE SOLUTION (OR SOAPY OR MUSTARD WATER) AND STICKING FINGER DOWN THROAT. CALL A PHYSICIAN IMMEDIATELY.

NOTES TO PHYSICIAN
NONE

INDUSTRIAL HYGIENE AND OCCUPATIONAL CONTROL PROCEDURES

VENTILATION: A SYSTEM OF LOCAL EXHAUST IS RECOMMENDED TO KEEP EMPLOYEE EXPOSURE BELOW THE AIRBORNE EXPOSURE LIMITS. LOCAL EXHAUST IS USUALLY PREFERRED BECAUSE IT CONTROLS THE EMISSION AT ITS SOURCE, PREVENTING DISPERSION OF IT INTO THE GENERAL WORK AREA. REFER TO THE ACGIH DOCUMENT "INDUSTRIAL VENTILATION, A MANUAL OF RECOMMENDED PRACTICES" FOR DETAILS.

RESPIRATORY PROTECTION: NIOSH/MSHA APPROVED RESPIRATOR FOR CYANIDE DUSTS AND MISTS IF EXPOSURE MAY, OR DOES EXCEED OCCUPATIONAL EXPOSURE LIMITS. GENERALLY, A DUST/MIST RESPIRATOR MAY BE WORN IN AREAS WHERE THE TLV IS EXCEEDED UP TO TEN TIMES. ALTERNATIVELY, A SUPPLIED AIR FULL FACEPIECE RESPIRATOR OR AIRLINED HOOD MAY BE WORN.

EYE PROTECTION: CHEMICAL SPLASH GOGGLES OR FACE SHIELD. CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH THIS MATERIAL.

SKIN PROTECTION: USE RUBBER, PLASTIC OR NEOPRENE IMPERVIOUS GAUNTLET TYPE GLOVES AND BODY-COVERING CLOTHING.

PERSONAL HYGIENE: WASH THOROUGHLY AFTER HANDLING.

AN EYE WASH FOUNTAIN AND QUICK-DRENCH FACILITIES SHOULD BE MAINTAINED

IN THE WORK AREA.

SAFE HANDLING, STORAGE, AND USE PRECAUTIONS

PRECAUTIONARY MEASURES: AVOID CONTACT WITH SKIN, EYES, AND CLOTHING. WEAR PROTECTIVE CLOTHING, GLOVES, AND SPLASH GOGGLES OR SHIELD. WASH THOROUGHLY AFTER USING. AVOID BREATHING DUST OR MIST. USE WITH ADEQUATE VENTILATION.

STORE IN A COOL, DRY, WELL VENTILATED AREA. ISOLATE FROM INCOMPATIBLE MATERIALS. AREAS IN WHICH EXPOSURE TO CYANIDES MAY OCCUR SHOULD BE CLEARLY INDENTIFIED AND ACCESS TO THE AREA SHOULD BE LIMITED TO AUTHORIZED PERSONNEL.

PROTECT FROM PHYSICAL DAMAGE.

ENVIRONMENTAL AND DISPOSAL PROCEDURES

SPILL/LEAK CLEAN-UP PROCEDURES: REMOVE COMBUSTIBLES AND SOURCES OF HEAT OR IGNITION. COVER WITH SODA ASH OR LIME. SWEEP, SCOOP, OR PICK UP SPILLED MATERIAL. AVOID DUSTING. PACKAGE FOR RECLAMATION OR RECOVERY. WHATEVER CANNOT BE SAVED MAY BE DISPOSED OF IN AN APPROVED LANDFILL. REMAINING CYANIDE WASTE MAY BE TREATED WITH ALKALINE HYPOCHLORITE. WASH CONTAMINATED AREA WITH ALKALINE HYPOCHLORITE SOLUTION TO DESTROY RESIDUAL CYANIDE.

DISPOSAL METHOD: DISPOSE OF IN AN APPROVED CHEMICAL WASTE LANDFILL IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS. IF APPROVED DRAIN TO WASTE TREATMENT PLANT OR GIVE TO DISPOSAL CONTRACTOR. DO NOT FLUSH TO DRAIN WHICH MAY CONTAIN STRONG ACIDS.

SUPERFUND REPORTABLE QUANTITY (RQ): 10# / 4.54 KG (KCN)

HAZARDOUS WASTE NO: P098

SARA TITLE III: (SECTION 313) THIS PRODUCT CONTAINS CYANIDE COMPOUNDS (57-15-5) WHICH ARE SUBJECT TO REPORTING.

SARA TITLE III: (SECTION 302) POTASSIUM CYANIDE IS CONSIDERED EXTREMELY HAZARDOUS AND IS SUBJECT TO REPORTING.
THRESHOLD PLANNING QUANTITY: 100#

NEW JERSEY LIST: EMPLOYERS WHO PRODUCE, USE, OR STORE THIS MATERIAL ARE REQUIRED TO FILL AN ANNUAL SURVEY DUE ON MARCH 1 OF EACH YEAR. (POTASSIUM CYANIDE)

TRANSPORTATION DATA

DOT SHIPPING NAME: POTASSIUM CYANIDE
DOT HAZARD CLASS: POISON B
HAZARDOUS INGREDIENTS: POTASSIUM CYANIDE
IDENTIFICATION-NUMBER: UN1680 *

*: FOR CONTAINERS/PACKAGES EXCEEDING 7,017 LBS., RQ IS REQUIRED.

NOTE: DURING AN INCIDENT INVOLVING THIS MATERIAL, DOT RECOMMENDS USE OF EMERGENCY RESPONSE GUIDE NO. 55

ADDITIONAL WARNINGS AND INFORMATION

"WARNING: THIS PRODUCT MAY CONTAIN A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, OR BIRTH DEFECTS, AND/OR OTHER REPRODUCTIVE HARM"

IT IS REASONABLE TO ASSUME THAT ALL METAL CYANIDE COMPOUNDS MAY CONTAIN ARSENIC, CADMIUM, CHROMIUM, AND LEAD IN CONCENTRATIONS RANGING FROM A FEW PARTS PER BILLION TO SEVERAL HUNDRED PARTS PER MILLION.

ALL INFORMATION PRESENTED HEREIN IS GIVEN IN GOOD FAITH AND IS BASED ON SOURCES AND TESTS CONSIDERED TO BE RELIABLE BUT CANNOT BE GUARANTEED. IT IS THE USER'S FULL RESPONSIBILITY TO ACCEPT RISK FOR THE SAFETY, TOXICITY, HANDLING, STORAGE, AND USE OF THE PRODUCT AS WELL AS TO DETERMINE THE SUITABILITY OF THE PRODUCT FOR A SPECIFIC PURPOSE. WE MAKE NO WARRANTY AS TO THE RESULTS TO BE OBTAINED IN USING THE PRODUCT; THEREFORE ALL RISKS MUST BE ASSUMED BY THE USER.

SWMUs 9, 10, 1

SECTION VI - HEALTH HAZARD DATA

Exposure Limits
TLV: 5 mg/m^3 Cyanide (as CN), skin TWA: 5 mg/m^3 Ceiling: NDA

Effects of Overexposure
Acute: death Entry via eyes, nose, skin, mouth

Chronic: NDA

Emergency First Aid Procedures: Seek medical assistance at once.

Eye: Wash with plenty of water (under lids) for 15 minutes, immediately.

Skin: Wash thoroughly with plenty of water. Remove contaminated clothing.

Inhalation: Remove to fresh air, have him lie down. Start treatment immediately with Cyanide First Aid Kit (amyl nitrite inhalant). Remove contaminated clothing.

Ingestion: Amyl nitrite inhalation, one ampule every 5 minutes. Keep victim warm.
* Gastric lavage and/or catharsis should be delayed until antidotes given.

OTHER HEALTH INFORMATION:
LISTED: ☐ Carcinogen ☐ Teratogen ☐ Mutagen ☒ Other Not listed by NTP, IARC or OSHA as a carcinogen

SECTION VII - SPECIAL PROTECTION INFORMATION — PRODUCTION AND/OR MAINTENANCE OPERATIONS

Respiratory Protection (Specify Type): Respirators approved for cyanide dusts or mists.

Ventilation			
	Local Exhaust: Adequate ventilation	Special: Do not wear contact lenses.	
	Mechanical (General): Exhaust fan	Other: Have on hand Cyanide first aid kit (Eli-Lilly NDC# 002-2362-OD)	
Protective Gloves: Rubber gauntlet		Eye Protection: Chemical Safety glasses	

Other Protective Equipment: Rubber boots, apron

SECTION VIII - SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled: Do not flush to sewer or stream. Cover with lime; pick up dry for disposal. Wash contaminated area with hypochlorite solution to oxidize residual cyanide.

Waste Disposal Method:
As prescribed for cyanides and heavy metals by local, state, and federal regulations.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in Handling and Storing: Do not ship or store next to acids or oxidizing agents. Keep containers tightly closed. Avoid contact with eyes, skin or mucous membrane. Do not swallow. Keep solutions alkaline.

Other Precautions:

SECTION X - TRANSPORTATION DATA:

Proper Shipping Name	RQ	Hazard Class	ID # (49CFR 172.101)
COPPER CYANIDE	NA	POISON B	UN1587

Label Requirement: POISON PLACARD: POISON

Special Information: * Antidotes: Amyl Nitrite and sodium thiosulfate. (Lilly Cyanide First Aid Kit NDC#002-2362-OD)

NA = NOT APPLICABLE NDA = NO DATA AVAILABLE < = LESS THAN > = MORE THAN

FORM NO. 61(8)85

TECHNIC INC.
POST OFFICE BOX 965, PROVIDENCE, R.I. 02901 (401) 781-6100
3265 N. RIDGE AVE., ARLINGTON HTS., ILL. 60005 (312) 253-3552
1170 HAWK CIRCLE, ANAHEIM, CAL. 92807 (714) 632-0200
1216 LUKE STREET, IRVING, TEXAS 75061 (214) 252-6593
TECHNIC PRECIOUS METALS (UK) LTD.
TECHNIC M & O IND. HONG KONG
CANADA EUROPE

SWMUs 9, 10, 11, 14

MATERIAL SAFETY DATA SHEET

Form similar to O.S.H.A - 20

SECTION I

MANUFACTURER'S NAME: TECHNIC, INC.	EMERGENCY TELEPHONE NO.: (401) 781-6100
ADDRESS (Number, Street, City, State, and ZIP Code): One Spectacle Street, Cranston, Rhode Island 02910	
CHEMICAL NAME AND SYNONYMS: Tarnish Remover	TRADE NAME AND SYNONYMS: TARNISOLVE
CHEMICAL FAMILY: Sulfuric Acid Base	FORMULA: Proprietary

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (UNITS)	ALLOYS AND METALLIC COATINGS	%	TLV (UNITS)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS					
ADDITIVES			OTHERS		
OTHERS			FILLER METAL PLUS COATING OR CORE FLUX		

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (UNITS)
Sulfuric Acid	13	1mg/m^3
Thiocarbamide	22	orl rat LD_{50} 20 mg/kg

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	250°F	SPECIFIC GRAVITY ( )	1.1
VAPOR PRESSURE (mm Hg.)	N.A.	PERCENT VOLATILE BY VOLUME (%)	80%
VAPOR DENSITY (AIR=1)	N.A.	EVAPORATION RATE (_____=)	----
SOLUBILITY IN WATER	Very Soluble	pH	
APPEARANCE AND ODOR	Clear pink solution		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): None	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA: Water			
SPECIAL FIRE FIGHTING PROCEDURES: None			
UNUSUAL FIRE AND EXPLOSION HAZARDS: None			

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section II

EFFECTS OF OVEREXPOSURE: Causes severe burns on contact.

EMERGENCY AND FIRST AID PROCEDURES: Skin: wash with water, neutralize with sodium bicarbonate and get to physician immediately. Internally: take to a hospital IMMEDIATELY. (Continued on back)

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	None

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wash with water.

WASTE DISPOSAL METHOD

Contains sulfuric acid. See local, state, and Federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE): Optional

VENTILATION	LOCAL EXHAUST: Yes		SPECIAL
	MECHANICAL (GENERAL)		OTHER

PROTECTIVE GLOVES: Yes

EYE PROTECTION: Chemical goggles

OTHER PROTECTIVE EQUIPMENT: None

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store in cool, dry place away from acids.

OTHER PRECAUTIONS

DATE: June, 1984 DIVISION: _____

SIGNATURE: _____

TARNISOLVE
SECTION V - HEALTH HAZARD DATA

THIS PRODUCT CONTAINS THIOUREA AND IS LISTED IN THE CHEMICAL LITERATURE AS HAVING CARCINOGENIC RISK. AS WITH ALL CHEMICALS, THIS PRODUCT SHOULD BE HANDLED ONLY BY TRAINED PERSONNEL, COGNIZANT OF THE POTENTIAL HAZARDS AND USING APPROPRIATE PROTECTIVE MEASURES.

SWMUs 9, 10, 11 and 14

APR 2 3 1990

MSDS 2020 MATERIAL SAFETY DATA SHEET

CP Chemicals, Inc.
1 Parker Plaza, Suite 1400
Fort Lee, NJ 07024
(201)944-6020

Emergency Medical Info.:
(803)481-8528
Transportation Emergency:
CHEMTREC (800)424-9300

Date: August 1, 1989 Supersedes:

I. PRODUCT IDENTIFICATION

Formula CAS No.: 143-33-9

Trade Name: Sodium Cyanide

Formula: NaCN Molecular Wt.: 49.01
Synonyms: Hydrocyanic acid, sodium salt

II. HAZARDOUS INGREDIENTS

Ingredients (CAS No.)	WT PCT (APPROX)	PEL MG/M3	PEL PPM	TLV(TWA) MG/M3	TLV(TWA) PPM
Sodium Cyanide (143-33-9)	99	5(CN)		5(CN)	

NE: not established
The TLV's are given for guidance; local applicable regulations should always be followed. Ingredients are those present at 1 % or greater, or at 0.1 % or greater if listed as potential carcinogens by OSHA/IARC/NTP. Proprietary ingredient identities are available in accordance with 29 CFR 1910.1200.
Carcinogen: NTP - no; IARC - no; OSHA - no

III. PHYSICAL AND CHEMICAL CHARACTERISTICS

NA = not applicable, NE = not established, D = decomposes

Boiling Point, 760 mm Hg (deg C):	1496 C
Melting/Freezing Point (deg C):	563 C
Specific Gravity (Water = 1):	1.61
Vapor Pressure (mm Hg):	1 at 817 C
Vapor Density (Air = 1):	not found
Water Solubility (% by WT):	34% at 15 C
Volatiles (% by WT):	not found
Evaporation Rate (Butyl Acetate = 1):	not found
pH of Solution:	NA

Appearance/Odor: White crystals, with an almond odor.

IV. PHYSICAL HAZARD DATA

Sodium Cyanide is not combustible, but if in contact with ...

Flash Point (deg C): NA Test Method: NA
Flammable Limits (% by VOL): NA
Autoignition Temp. (deg C): NA

Extinguishing Media: Any suitable means to extinguish surrounding fire. Use water spray to cool drums. Do not use carbon dioxide or other acidic type extinguishers. Avoid flushing to sewer.

Special Fire Fighting Procedures: Use NIOSH approved self-contained breathing apparatus operated in the pressure demand or other positive pressure mode. Use protective clothing appropriate to the surrounding fire.

Unusual Fire or Explosion Hazards: Not considered an explosion hazard, but upon heating with chlorates or nitries to 450 C may cause an explosion. When fighting nearby fire, do not flush into water course or into area where sodium cyanide might mix with strong acid, and release poisonous and flammable hydrogen cyanide (HCN) gas.

NA: not applicable

V. REACTIVITY DATA

Thermal Stability: Stable under ordinary conditions of use and storage. May form toxic concentrations of hydrogen cyanide gas when in prolonged contact with air in a closed area, or by contact with carbon dioxide and acids.

Incompatibility: Nitrates, nitrites, chlorates, fluorine, magnesium, and strong oxidizers. Reacts with acids to liberate toxic hydrogen cyanide.

Hazardous Polymerization: Will not occur.

Hazardous Decomposition Products: Thermal decomposition releases fumes of cyanide and sodium oxide. Acidification releases toxic and flammable hydrogen cyanide gas.

VI. HEALTH HAZARD INFORMATION

Effects of Overexposure:

Symptoms of Ingestion: HIGHLY TOXIC! Corrosive to the gastrointestinal tract with burning in the mouth and esophagus, and abdominal pain. Massive doses may produce sudden loss of consciousness and prompt death from respiratory arrest. Smaller but still lethal doses may prolong the illness for one or more hours. Bitter almond odor may be noted on the breath or vomitus. Other symptoms may be similar to those noted for inhalation exposure.

Symptoms of Inhalation: Corrosive to the respiratory tract. The substance inhibits cellular respiration. May cause headache, weakness, dizziness, labored breathing, nausea and vomiting,

which can be followed by weak and irregular heart beat, unconsciousness, convulsions, coma and death.

Symptoms of Skin Contact: CORROSIVE. May cause severe pain and skin burns. Solutions are corrosive to the skin and eyes, and may cause deep ulcers which heal slowly. May be absorbed through the skin, with symptoms similar to those noted for inhalation.

Symptoms of Eye Contact: CORROSIVE. Symptoms may include redness, pain, blurred vision, and eye damage.

Chronic exposure: Prolonged or repeated skin exposure may cause dermatitis. May aggravate other pre-existing disorders, to include; dermatitis, conjunctivitis, respiratory diseases, allergies, anoxia or anemia, nervous disorders.

ACUTE EXPOSURE CAN BE FATAL

document "Industrial Ventilation, A Manual of Recommended Practice" for details.

Respiratory Protection: NIOSH/MSHA approved respirator for cyanide dusts and mists if exposure may, or does exceed occupational exposure limits. Generally, a dust/mist respirator may be worn in areas where the TLV is exceeded up to ten times. Alternatively, a supplied air full facepiece respirator or airlined hood may be worn.

Eye Protection: Chemical splash goggles or face shield. Contact lenses should not be worn when working with this material.

Skin Protection: Use rubber, plastic or neoprene impervious gauntlet type gloves and body-covering clothing.

Personal Hygiene: Wash thoroughly after handling.

An eye wash fountain and quick-drench facilities should be maintained in the work area.

IX. SAFE HANDLING, STORAGE, AND USE PRECAUTIONS

Precautionary Measures: Avoid contact with skin, eyes, and clothing. Wear protective clothing, gloves, and splash goggles or shield. Wash thoroughly after using. Avoid breathing dust or mist. Use with adequate ventilation.

Store in a cool, dry, well ventilated area. Isolate from incompatible materials. Areas in which exposure to cyanides may occur should be clearly identified and access to the area should be limited to authorized personnel.

Protect from physical damage.

X. ENVIRONMENTAL AND DISPOSAL PROCEDURES

Spill/Leak Clean-Up Procedures: Remove combustibles and sources of heat or ignition. Cover with soda ash or lime. Sweep, scoop, or pick up spilled material. Avoid dusting. Package for reclamation or recovery. Whatever cannot be saved may be disposed of in an approved landfill. Remaining cyanide waste may be treated with sodium or calcium hypochlorite. Wash contaminated area with sodium or calcium hypochlorite solution to destroy residual cyanide.

Disposal Method: Dispose of in an approved chemical waste landfill in accordance with applicable Federal, State, and local regulations. Cyanides must be oxidized to harmless waste before disposal. An alkaline solution (pH about 10) is treated with chlorine or commercial bleach in excess to decompose cyanide. When cyanide-free, it can be neutralized. IF APPROVED drain to waste treatment plant or give to disposal contractor. DO NOT flush to drain which may contain strong acids.

Superfund Reportable Quantity(RQ): 10#/4.54kg (NaCN)

Hazardous Waste No.: P106

SARA Title III: (Section 313) This product contains cyanide compounds (57-12-5) which are subject to reporting.

SARA Title III: (Section 302) Sodium cyanide (143-33-9) is considered EXTREMELY HAZARDOUS and is subject to reporting.
Threshold Planning Quantity: 100#

XI. TRANSPORTATION DATA

DOT Shipping Name: Sodium Cyanide, Solid
DOT Hazard Class: Poison B
Hazardous Ingredients: Not applicable except under "Additional Warnings and Information".
Identification Number: UN1689 - RQ

Note: During an incident involving this material, DOT recommends use of Emergency Response Guide no. 55.

XII. ADDITIONAL WARNINGS AND INFORMATION

"WARNING: THIS PRODUCT MAY CONTAIN A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, OR BIRTH DEFECTS, AND/OR OTHER REPRODUCTIVE HARM"

It is reasonable to assume that all metal cyanide compounds may contain arsenic, cadmium, chromium, and lead in concentrations ranging from a few parts per billion to several hundred parts per million.

All information presented herein is given in good faith and is based on sources and tests considered to be reliable but cannot be guaranteed. It is the user's full responsibility to accept risk for the safety, toxicity, handling, storage, and use of the product as well as to determine the suitability of the product for a specific purpose. We make no warranty as to the results to be obtained in using the product; therefore all risks must be assumed by the user.

*SWMH 11

PORT NUMBER: 971 VAN WATERS & ROGERS INC. PAGE: 001
DS NO: P1192V MATERIAL SAFETY DATA SHEET
FECTIVE DATE: 10/29/92 VERSION: 001

ODUCT: SULFAMIC ACID

ORDER NO:
PROD NO :

N WATERS & ROGERS INC. , SUBSIDIARY OF UNIVAR (206)889-3400
100 CARILLON POINT , KIRKLAND , WA 98033

---------- EMERGENCY ASSISTANCE ----------

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

---------- FOR PRODUCT AND SALES INFORMATION ----------

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE AT
VW&R INDIANAPOLIS 317-547-4811 INDIANAPOLIS, IN

****
SECTION I - PRODUCT IDENTIFICATION
****

RODUCT NAME: SULFAMIC ACID

DS #: P1192V

ATE ISSUED: 06/15/90

HEMICAL NAME: Sulfamic acid

UPAC NOMENCLATURE: Amidosulfuric acid

YNONYMS: Amidosulfonic acid, aminosulfonic acid

HEMICAL FAMILY: Inorganic acid

ORMULA: NH2SO3H

AS REGISTRY NO: 5329-14-6

****
SECTION II - PHYSICAL DATA
****

EPORT NUMBER: 971 VAN WATERS & ROGERS INC. PAGE: 002
SDS NO: P1192V MATERIAL SAFETY DATA SHEET
FFECTIVE DATE: 10/29/92 VERSION: 001

RODUCT: SULFAMIC ACID

ORDER NO:
PROD NO :

PECIFIC GRAVITY: 2.126
ELTING POINT: 401 Deg F (205 Deg C)
OILING POINT: Decomposes at 408 Deg F (209 Deg C)
APOR PRESSURE/DENSITY: Not volatile
OLATILE BY VOLUME (%): 0
VAPORATION RATE: Not volatile

OLUBILITY IN WATER :	Wt.	gm./100 gm H20
t 60 Deg F (15.6 Deg C)	17	21
t 68 Deg F (20.0 Deg C)	18	22
t 80 Deg F (26.7 Deg C)	19	24
t 100 Deg F (37.8 Deg C)	22	28
t 140 Deg F (60.0 Deg C)	27	37
t 160 Deg F (71.1 Deg C)	30	43

PPEARANCE: White crystalline solid
DOR: None
H VALUE: 1.18 in 1% aqueous solution

SECTION III - FIRE AND EXPLOSION HAZARD DATA

LASH POINT: Will not burn
LAMMABLE LIMITS: Will not burn
IRE FIGHTING MEDIA: Use media proper to primary cause of fire.

IRE/EXPLOSION HAZARDS: May release sulfur dioxide (SO2), sulfur trioxide (SO3) and ammonia gas (NH3) if involved in a fire.

XTINGUISHING MEDIA: Water, chemical foam, or carbon dioxide (CO2) may be used for fires in the area.

PECIAL FIRE FIGHTING PROCEDURES: Water solution of sulfamic acid is strongly acidic.

SECTION IV - HEALTH HAZARD DATA

XPOSURE LIMITS: Exposure limits for sulfamic acid have not been established by OSHA or ACGIH. We recommend an 8-hour Time Weighted Average of 1 mg/m3 in air.

FFECTS OF EXPOSURE: Causes eye burns. Irritates nose, throat and skin.

AFETY PRECAUTIONS: Do not get in eyes. Avoid contact with skin and clothing. Avoid breathing dust. Wash thoroughly after handling.

ORT NUMBER: 971 VAN WATERS & ROGERS INC. PAGE: 003
S NO: P1192V MATERIAL SAFETY DATA SHEET
ECTIVE DATE: 10/29/92 VERSION: 001

DUCT: SULFAMIC ACID

ORDER NO:
PROD NO :

SECTION V - FIRST AID PROCEDURES

st AID:

E CONTACT: Immediately flush eyes with plenty of water for at st 15 minutes. Call a physician.

IN CONTACT: Flush skin with plenty of water.

SWALLOWED: Drink a lot of water. Call a physician.

SECTION VI - REACTIVITY DATA

ABILITY: Sulfamic acid and its aqueous solution are stable at room mperature.

COMPOSITION: Decompases with heat (408 Deg F/209 Deg C) to release sulfur oxide (SO2), sulfur trioxide (SO3), nitrogen (N2), Water (H2O), and ammonia s NH3).

DROLYSIS: At elevated temperatures, concentrated sulfamic acid aqueous lution hydrolyzes rapidly generating heat and steam.

CONPATIBLE MATERIALS: Hazardous reaction in aqueous solution may occur with lorine, hypochlorous acid, hypochlorites, cyanides or sulfides.

ZARDOUS DECOMPOSITION OF PRODUCTS: Sulfur dioxide (SO2), sulfur trioxide O3), Ammonia gas (NH3).

ZARDOUS POLYMERIZATION: Will not occur

SECTION VII - SPILL OR LEAK PROCEDURES

I CASE MATERIAL IS RELEASED OR SPILLED: Sweep up spillage and flush the area th large quantities of water to waste water treatment system. May be utralized with alkalies.

STE DISPOSAL: Should be neutralized with alkalies. Comply with federal, ate and local regulations.

UATIC TOXICITY: TL = 98 hr. = 96./5 ppm

:OAT NUMBER: 971 VAN WATERS & ROGERS INC. PAGE: 004
:S NO: P1192V MATERIAL SAFETY DATA SHEET
TECTIVE DATE: 10/29/92 VERSION: 001

:ODUCT: SULFAMIC ACID

ORDER NO:
PROD NO :

SECTION VIII - SPECIAL PRECAUTIONS

3RAGE: Prevent from absorption of moisture and possible caking. should be ored in a cool and dry place. Do not store with cyanides, sulfides, lorine, hypochlorous acid or hypochlorites.

SECTION IX - SHIPPING INFORMATION

t regulated as a hazardous material by D.O.T.

FOR ADDITIONAL INFORMATION

CONTACT: MSDS COORDINATOR VW&R INDIANAPOLIS
DURING BUSINESS HOURS, PACIFIC TIME (206)827-3400

12/10/92 07:25 PRODUCT: CUST NO: ORDER NO:

NOTICE

VAN WATERS & ROGERS INC. ("VW&R") EXPRESSLY DISCLAIMS ALL EXPRESS OR

:PLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE,

:TH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED HEREIN. **

ALL INFORMATION APPEARING HEREIN IS BASED UPON DATA OBTAINED FROM THE 'NUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES. WHILE THE INFORMATION IS ILIEVED TO BE ACCURATE, VW&R MAKES NO REPRESENTATIONS AS TO ITS ACCURACY OR JFFICIENCY. CONDITIONS OF USE ARE BEYOND VW&RS CONTROL AND THEREFORE USERS RE RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN OPERATING CONDITIONS TO ETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR PARTICULAR PURPOSES AND THEY SSUME ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM HE PUBLICATION OR USE OF, OR RELIANCE UPON , INFORMATION CONTAINED HEREIN. HIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT ELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER ROCESS.

* * * E N D O F M S D S * * *

HEMICALS, INC.
ER PLAZA, SUITE 1400
LEE, N.J. 07024
7944-6020

EMERGENCY MEDICAL INFO.:
(803)481-8528
TRANSPORTATION EMERGENCY:
CHEMTREC (800)424-9300

E : 10/23/90 SUPERSEDES : 5/23/90

SWMM 9/10

PRODUCT IDENTIFICATION

********** N.F.P.A. **********	
DEGREE OF HAZARD	EMERGENCY HAZARD RATING
4 = EXTREME	HEALTH < 1 >
3 = HIGH	FIRE < 0 >
2 = MODERATE	REACTIVITY < 1 >
1 = SLIGHT	SPECIFIC HAZARD < >
0 = INSIGNIFICANT	

FORMULA CAS NO.: 10101-97-0 (HEXAHYDRATE)
TSCA CAS NO.: 7786-81-4 (ANHYDROUS)

TRADE NAME: NICKEL SULFATE HEXAHYDRATE

FORMULA: NISO4.6H20 MOLECULAR WT.: 262.88
SYNONYMS: NICKEL(II) SULFATE HEXAHYDRATE.

HAZARDOUS INGREDIENTS

INGREDIENTS (CAS NO.)	WT PCT (APPROX)	PEL MG/M3	PEL PPM	TLV(TWA) MG/M3	TLV(TWA) PPM
NICKEL SULFATE (7786-81-4)	59	1.0 (NI)		0.1 (NI)	

E: NOT ESTABLISHED

THE TLV'S ARE GIVEN FOR GUIDANCE; LOCAL APPLICABLE REGULATIONS SHOULD ALWAYS BE FOLLOWED. INGREDIENTS ARE THOSE PRESENT AT 1% OR GREATER, OR AT 0.1% OR GREATER IF LISTED AS POTENTIAL CARCINOGENS BY OSHA/IARC/NTP. PROPRIETARY INGREDIENT IDENTITIES ARE AVAILABLE IN ACCORDANCE WITH 29 CFR 1910.1200.
CARCINOGEN: NTP - ANTICIPATED; IARC - YES; OSHA - NO

PHYSICAL AND CHEMICAL CHARACTERISTICS

NA = NOT APPLICABLE, NE = NOT ESTABLISHED, D = DECOMPOSES

BOILING POINT, 760 MM HG (DEG C):	NA
MELTING/FREEZING POINT (DEG C):	D AT 840 C
SPECIFIC GRAVITY (WATER = 1):	3.07
VAPOR PRESSURE (MM HG):	NOT FOUND
VAPOR DENSITY (AIR = 1):	NOT FOUND
WATER SOLUBILITY (% BY WT):	62.5G/100 ML WATER AT 0 C
VOLATILES (% BY WT):	NA
EVAPORATION RATE (BUTYL ACETATE = 1):	NOT FOUND
PH OF SOLUTION:	NA

APPEARANCE/ODOR: ODORLESS, DEEP GREEN TRANSPARENT CRYSTALS.

PHYSICAL HAZARD DATA

NICKEL SULFATE IS NOT CONSIDERED TO BE A FIRE HAZARD.

FLASH POINT (DEG C): NA TEST METHOD: NA
FLAMMABLE LIMITS (% BY VOL): NA
AUTOIGNITION TEMP. (DEG C): NA

EXTINGUISHING MEDIA: ANY SUITABLE MEANS TO EXTINGUISH SURROUNDING FIRE.

SPECIAL FIRE FIGHTING PROCEDURES: USE SPECIAL BREATHING EQUIPMENT AND PROTECTIVE CLOTHING APPROPRIATE TO THE SURROUNDING FIRE.

UNUSUAL FIRE OR EXPLOSION HAZARDS: NOT CONSIDERED TO BE AN EXPLOSION HAZARD.

NA: NOT APPLICABLE

REACTIVITY DATA

THERMAL STABILITY: STABLE UNDER ORDINARY CONDITIONS OF USE AND STORAGE.

INCOMPATIBILITY: NO INCOMPATIBILITY DATA FOUND.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

HAZARDOUS DECOMPOSITION PRODUCTS: WHEN HEATED TO DECOMPOSITION IT EMITS TOXIC FUMES OF SULFUR OXIDES.

HEALTH HAZARD INFORMATION

EFFECTS OF OVEREXPOSURE:

SYMPTOMS OF INGESTION: IRRITATING TO THE DIGESTIVE TRACT. SYMPTOMS MAY INCLUDE NAUSEA, VOMITING, ABDOMINAL PAIN AND DIARRHEA. ABSORPTION IS POOR, BUT SHOULD IT OCCUR, SYMPTOMS MAY INCLUDE GIDDINESS, CAPILLARY DAMAGE, MYOCARDIAL WEAKNESS, CENTRAL NERVOUS SYSTEM DEPRESSION, AND KIDNEY AND LIVER DAMAGE.

SYMPTOMS OF INHALATION: MAY CAUSE IRRITATION OF THE UPPER RESPIRATORY TRACT. SYMPTOMS MAY INCLUDE COUGHING, SORE THROAT, AND SHORTNESS OF BREATH.

SYMPTOMS OF SKIN CONTACT: MAY CAUSE SKIN IRRITATION, REDNESS AND PAIN. SOME INDIVIDUALS MAY BECOME SENSITIZED TO THE SUBSTANCE AND SUFFER "NICKEL ITCH," A FORM OF DERMATITIS.

CHRONIC EXPOSURE: PROLONGED OR REPEATED SKIN EXPOSURE MAY CAUSE DERMATITIS. PROLONGED EXPOSURE TO EXCESSIVE CONCENTRATIONS OF DUST MAY CAUSE CHRONIC PULMONARY DISORDERS.

TOXICITY DATA:

ORAL TOXICITY:	LD50; 300 MG/KG (RAT)
MUTAGENICITY:	REFERENCES CITED;
OTHER ACUTE TOXICITY:	NO LD50/LC50 INFORMATION FOUND RELATING TO NORMAL ROUTES OF OCCUPATIONAL EXPOSURE.

EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: IMMEDIATELY, FLUSH WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE HOLDING EYELIDS APART. WASHING WITHIN ONE MINUTE IS ESSENTIAL TO ACHIEVE MAXIMUM EFFECTIVENESS. GET IMMEDIATE MEDICAL ATTENTION AFTER FLUSHING.

SKIN CONTACT: WASH AFFECTED AREA THOROUGHLY WITH WATER. REMOVE CONTAMINATED CLOTHING AND LAUNDER BEFORE REUSE. GET MEDICAL ATTENTION PROMPTLY.

INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. CALL A PHYSICIAN.

INGESTION: NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. INDUCE VOMITING IMMEDIATELY BY GIVING TWO GLASSES OF WATER, OR MILK IF AVAILABLE AND STICKING FINGER DOWN THROAT. CALL A PHYSICIAN IMMEDIATELY.

NOTES TO PHYSICIAN

NONE

INDUSTRIAL HYGIENE AND OCCUPATIONAL CONTROL PROCEDURES

VENTILATION: A SYSTEM OF LOCAL EXHAUST IS RECOMMENDED TO KEEP EMPLOYEE EXPOSURE BELOW THE AIRBORNE EXPOSURE LIMITS. LOCAL EXHAUST IS USUALLY PREFERRED BECAUSE IT CONTROLS THE EMISSION AT ITS SOURCE, PREVENTING DISPERSION OF IT INTO THE GENERAL WORK AREA. REFER TO THE ACGIH DOCUMENT "INDUSTRIAL VENTILATION, A MANUAL OF RECOMMENDED PRACTICES" FOR DETAILS.

RESPIRATORY PROTECTION: NIOSH/MSHA APPROVED RESPIRATOR IF EXPOSURE MAY, OR DOES EXCEED OCCUPATIONAL EXPOSURE LIMITS. GENERALLY, A DUST/MIST RESPIRATOR MAY BE WORN IN AREAS WHERE THE TLV IS EXCEEDED UP TO TEN TIMES. ALTERNATIVELY, A SUPPLIED AIR FULL FACEPIECE RESPIRATOR OR AIRLINED HOOD MAY BE WORN.

EYE PROTECTION: CHEMICAL SPLASH GOGGLES AND/OR FACE SHIELD. CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH THIS MATERIAL.

SKIN PROTECTION: USE RUBBER OR NEOPRENE IMPERVIOUS GLOVES AND BODY-COVERING CLOTHING.

PERSONAL HYGIENE: WASH THOROUGHLY AFTER HANDLING.

AN EYE WASH FOUNTAIN AND QUICK-DRENCH FACILITIES SHOULD BE MAINTAINED IN THE WORK AREA.

SAFE HANDLING, STORAGE, AND USE PRECAUTIONS

PRECAUTIONARY MEASURES: AVOID CONTACT WITH SKIN, EYES, AND CLOTHING. WEAR PROTECTIVE CLOTHING, GLOVES, AND SPLASH GOGGLES OR SHIELD. WASH THOROUGHLY AFTER USING. AVOID BREATHING DUST OR MIST. USE WITH ADEQUATE VENTILATION.

STORE IN A COOL, DRY, WELL VENTILATED AREA. AREAS IN WHICH EXPOSURE TO NICKEL METAL OR SOLUBLE NICKEL COMPOUNDS MAY OCCUR SHOULD BE CLEARLY IDENTIFIED AND ACCESS TO THE AREA SHOULD BE LIMITED TO AUTHORIZED PERSONNEL.

PROTECT FROM PHYSICAL DAMAGE.

ENVIRONMENTAL AND DISPOSAL PROCEDURES

SPILL/LEAK CLEAN-UP PROCEDURES: VENTLATE AREA OF LEAK OR SPILL. SWEEP,

SCOOP, OR PICK UP SPILLED MATERIAL. AVOID DUSTING. PACKAG FOR RECLAMATION OR RECOVERY. WHATEVER CANNOT BE SAVED MAY BE DISPOSED OF AN APPROVED LANDFILL.

DISPOSAL METHOD: DISPOSE OF IN AN APPROVED CHEMICAL WASTE LANDFILL IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.

SUPERFUND REPORTABLE QUANTITY(RQ): 100#/45.4 KG (NISO4)

HAZARDOUS WASTE NO.: NOT REGULATED

SARA TITLE III: (SECTION 313) THIS PRODUCT IS A NICKEL COMPOUND WHICH IS SUBJECT TO REPORTING.

CANADIAN (WHIS) LIST: NICKEL SULFATE (7786-81-4) IS SUBJECT TO REPORTING.

NEW JERSEY LIST: EMPLOYERS WHO PRODUCE, USE, OR STORE THIS MATERIAL ARE REQUIRED TO FILL AN ANNUAL SURVEY DUE ON MARCH 1 OF EACH YEAR. (NICKEL SULFATE)

TRANSPORTATION DATA

DOT SHIPPING NAME: HAZARDOUS SUBSTANCE, SOLID N.O.S.* (NICKEL SULFATE HEXAHYDRATE)
DOT HAZARD CLASS: ORM-E *
HAZARDOUS INGREDIENTS: NICKEL SULFATE, ALSO SEE "ADDITIONAL WARNINGS AND INFORMATION."
IDENTIFICATION NUMBER: NA9188 - RQ *

*: PACKAGES LESS THAN 169.49 LBS. ARE NOT REGULATED BY DOT.
SHIPPING NAME FOR SUCH PACKAGES: CHEMICALS, N.O.S. (NICKEL SULFATE HEXAHYDRATE)

NOTE: DURING AN INCIDENT INVOLVING THIS MATERIAL, USE OF DOT EMERGENCY RESPONSE GUIDE NO. 31 IS ALSO RECOMMENDED.

ADDITIONAL WARNINGS AND INFORMATION

"WARNING: THIS PRODUCT MAY CONTAIN A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, OR BIRTH DEFECTS, AND/OR OTHER REPRODUCTIVE HARM"

IT IS REASONABLE TO ASSUME THAT ALL NICKEL COMPOUNDS CONTAIN ARSENIC,

CADMIUM, CHROMIUM, AND LEAD IN CONCENTRATIONS RANGING FROM A FEW PARTS PER BILLION TO SEVERAL HUNDRED PARTS PER MILLION.

ALL INFORMATION PRESENTED HEREIN IS GIVEN IN GOOD FAITH AND IS BASED ON SOURCES AND TESTS CONSIDERED TO BE RELIABLE BUT CANNOT BE GUARANTEED. IT IS THE USER'S FULL RESPONSIBILITY TO ACCEPT RISK FOR THE SAFETY, TOXICITY, HANDLING, STORAGE, AND USE OF THE PRODUCT AS WELL AS TO DETERMINE THE SUITABILITY OF THE PRODUCT FOR A SPECIFIC PURPOSE. WE MAKE NO WARRANTY AS TO THE RESULTS TO BE OBTAINED IN USING THE PRODUCT; THEREFORE ALL RISKS MUST BE ASSUMED BY THE USER.

* SWMU 74

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6,290

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

11/15/85

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Erbrich Products Company	(317) 925-6433 M-F 8:00-5:00
ADDRESS (Number, Street, City, State, and ZIP Code) 1120 E. 32nd street, Indianapolis, Indiana 46205	
CHEMICAL NAME AND SYNONYMS Aqua Ammonia - Ammonium Hydroxide	TRADE NAME AND SYNONYMS Ammonia
CHEMICAL FAMILY Alkali	FORMULA NH4OH

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Ammonium Hydroxide	3.25	

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	212°F	SPECIFIC GRAVITY (H_2O=1)	.9825
VAPOR PRESSURE (mm Hg.)	.7@60F	PERCENT, VOLATILE BY VOLUME (%)	None
VAPOR DENSITY (AIR=1)	.597	EVAPORATION RATE (_____ =1)	1
SOLUBILITY IN WATER	Miscible @ all conc.		
APPEARANCE AND ODOR	Opaque and pungent		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None- normal conditions			

EXTINGUISHING MEDIA N/A

SPECIAL FIRE FIGHTING PROCEDURES N/A

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
50-100 PPM in air for 8 hrs. continuous exposure is permissible

EFFECTS OF OVEREXPOSURE
Coughing, irritation to all mucous membranes and eyes - up to and including @ 400 PPM in air. @1720 PPM exposure maybe fatal (1/2 hr).

EMERGENCY AND FIRST AID PROCEDURES
Get to uncontaminated area immediately. Flush eyes and/or skin with water for 15 min. Can instill 2-3 drops .05% Pontocaine or similar anesthetic. Do not add oils or oily ointment to eyes.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	Storing in high temperature areas

INCOMPATABILITY *(Materials to avoid)*
Strong acids, chlorine, bromine and iodine

HAZARDOUS DECOMPOSITION PRODUCTS
None - only vapors given off.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Flush area with water, provide ventilation to remove vapors. Mild vinegar will neutralize.

WASTE DISPOSAL METHOD
Dilute with large quantities of water. In case of massive spill to sewer, neutralization with an acid material may be necessary.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
None

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES: Rubber	EYE PROTECTION: Splash or safety glasses

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Should be stored in a safe manner away from heat.

OTHER PRECAUTIONS
Always use product in well ventilated area. Do not use or mix with other cleaning products.

MATERIAL SAFETY DATA SHEET

SOL

SWMU 14

1. MATERIAL AND MANUFACTURER IDENTIFICATION

Product name	TRIM® SOL
Material type	Water miscible cutting and grinding fluid concentrate
Classification/synonym(s)	Chemical emulsion/Soluble oil
Product use	Coolant and lubricant in metal removal processes
Manufacturer address	MASTER CHEMICAL CORPORATION 501 West Boundary Perrysburg, OH 43551-1263
Emergency telephone	419-874-7902 **Fax number** 419-874-0864

2. REGULATORY INFORMATION

Department of Transportation	DOT Hazard Class: None TRIM® SOL is not classified as a hazardous material by DOT.
Resource Conservation and Recovery Act	EPA Hazardous Waste Number(s): None TRIM® SOL is not classified as a hazardous waste by EPA.
Toxic Substances Control Act	All TRIM® SOL ingredients are listed on the TSCA inventory of Chemical Substances.
Superfund Amendments and Reauthorization Act of 1986	TRIM® SOL does not contain any Section 302/304 Extremely Hazardous Substances or Section 313 Toxic Chemicals.

3. INGREDIENT INFORMATION

COMPONENT	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED	CAS #	% RANGE
petroleum oil	5 mg/m³ (mist)	5 mg/m³ (mist)	none	8002-05-9	30-40
petroleum sulfonate	none	none	none	61789-85-3	20-30
chlorinated alkene polymer	none	none	none	68410-99-1	20-30
nonionic surfactant	none	none	none	68991-48-0	1-10
aromatic alcohol	none	none	none	68603-15-8	1-10
propylene glycol ether	none	none	none	68603-15-6	1-10
propylene glycol	none	none	none	57-55-6	<1
substituted indole	none	none	none	63231-48-1	<1
blue-green dye	none	none	none	63231-48-1	<1
silicone defoamer	none	none	none	63148-62-9	<1
water	none	none	none	7732-18-5	balance

The exact chemical identities and percentages of the raw materials used in TRIM® SOL are trade secrets. This information is being withheld as provided for in the Occupational Safety and Health Administration's Hazard Communication Rule (29 CFR 1910.1200).

4. PHYSICAL DATA

Boiling point (at 760 mm Hg)	217°F (103°C)	**Specific gravity (H_2O=1)**	0.99
Vapor pressure (psi)	<1	**Percent volatiles by volume**	18.48%
Vapor density (Air=1)	Not determined	**Evaporation rate (butyl acetate=1)**	1
Solubility in water	100%	**pH of concentrate**	Not applicable
Appearance	Dark green viscous liquid with a mild, pleasant odor	**pH of freshly mixed emulsion with demineralized water at 5%**	9.1
		Normal pH range for working solution	7.3-8.5

5. FIRE AND EXPLOSION HAZARD DATA

Flash point (test method)	305°F (152°C) (COC) None (TCC)	**Flammable limits**	Not determined
Extinguishing media	As appropriate for the surrounding fire; water (flood with water), dry chemical, CO_2 or "alcohol" foam		
Special fire fighting procedures	None	**Unusual fire and explosion hazards**	None

6. HEALTH HAZARD DATA

Threshold limit value	None established by ACGIH or OSHA	
Acute effects of overexposure	Eye Contact	Transient irritation
	Skin Contact	Possible defatting, nonirritant, nonsensitizer
	Inhalation	Nontoxic
	Ingestion	Nontoxic
	Skin Absorption	Nontoxic
Chronic effects of overexposure	None currently known	
Product/ingredients listed as carcinogen or potential carcinogen?	NTP Annual Report No	IARC Monographs No OSHA No
Signs and symptoms of exposure	None	
Medical conditions generally aggravated by exposure	None known	
Emergency and first aid procedures	Eyes	Flush immediately with cool, clean water for at least 15 minutes
	Skin	Wash with mild soap and warm water
	Inhalation	Remove to fresh air
	Ingestion	If large quantities are ingested, contact a physician
		In every case get medical attention as required

7. REACTIVITY DATA

Stability	Stable	Conditions to avoid	None
Incompatibility (materials to avoid)	Strong oxidizers, acids and alkalis		
Hazardous combustion or decomposition products	Thermal decomposition (fire) may produce CO, CO_2, HCl, SO_2		
Hazardous polymerization	Will not occur	Conditions to avoid	None

8. SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled	Mop up or use dry absorbent
Waste disposal method	Chemical treatment Refer to Data and Information Sheet for suggested procedure

9. SPECIAL PROTECTION INFORMATION

Respiratory protection (specify type)	None	
Ventilation	Local exhaust	Not normally required
	Mechanical (general)	General room ventilation should be sufficient
	Special	None
	Other	None
Protective gloves	None	
Other protective equipment	None	
Eye protection	Safety glasses	

10. SPECIAL PRECAUTIONS

Precautions to be taken in handling and storing	Refer to Data and Information Sheet or container labels
Other precautions	None
Date of preparation	October, 1990

The information herein is given in good faith and believed cur-

SWMU 11

OMI INTERNATIONAL CORPORATION
21441 Hoover Road, Warren, MI 48089

24-Hour EMERGENCY Phone Number
313-497-9129

REVISION: 12/21/88

MATERIAL SAFETY DATA SHEET

May be used to comply with OSHA's Hazard Communication Standard, 29CFR 1910. 1200. Standard must be consulted for specific requirements.

Section I

S-115

Product Trade Name: SEL-REX: LECTROLESS® NI Make Up 902000

Proprietary Formulation

Section II

Hazardous Components	CAS No.	Percentage	TLV OSHA ACGIH	Listed: NTP/IARC/OSHA Z/EPA
*Nickel Compound/ Soluble as Ni	7440-02-0	< 5	0.1 mg/m³	NTP anticipated human carcinogen IARC probable human carcinogen (2A) OSHA Z

* SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III AND OF 40 CFR 372.

Physical Data — Section III

Appearance and Odor: Light green solution with slight vinegar odor.

Solubility in Water:			
Negligible	<0.1%		
Slight	0.1-1.0%		
Moderate	1.0-10.0%		
Appreciable	>10.0%		
Complete(all proportions)		X	

Boiling Point	N/A
Vapor Pressure	N/A
Percent Volatile by Volume	N/A
Evaporation Rate	N/A
Specific Gravity	1.12 - 1.13
pH	6 - 6.5

Fire and Explosion Hazard Data — Section IV

Flash Point (method used): None — Flammable/Explosive Limits LEL N/A UEL N/A

NFPA Code (0-4): Health 1 Flammability 0 Reactivity 0

Extinguishing Media: Product will not burn.

Special Fire-Fighting Procedures: Use media suitable for surrounding fire.

Unusual Fire and Explosion Hazards: None known.

Health Hazard Data — Section V

Threshold Limit Value: None known or established.

Effects of Overexposure:

Acute: Possible eye and skin irritant.

Chronic: Prolonged exposure may result in rash, "nickel itch".

Principal Route of Exposure: Contact.

Emergency First Aid Procedures:

Eye: Flush with a directed stream of water for 15 minutes.

Skin: Wash with soap and water.

Inhalation: Remove to fresh air.

Swallowing: Drink water (2-3 glasses) to dilute.

OMI International Corporation Material Safety Data Sheet

Product Trade Name LECTROLESS® Nickel Make Up

Reactivity Data **Section VI**

Stability: Stable X Unstable

Incompatibility (Materials to Avoid): None known

Hazardous Decomposition Products: None

Hazardous Polymerization May Occur Will Not Occur X

Spill or Leak Procedures **Section VII**

Steps to be taken in case material is released or spilled:
Contain and place into a container suitable for transportation to a licensed waste treatment facility.

Waste Disposal Method Licensed waste treatment facility.

EPA I.D. Number N/A RQ: N/A

Special Protection Information **Section VIII**

Ventilation:
Local Exhaust Yes Respiratory Protection No

Protective Clothing:
Gloves Butyl rubber or neoprene Boots No
Chemical Safety Goggles Yes Other: No
Full Face Shield No

Note: Eye Fountain and Safety Shower must always be available.

Special Precautions **Section IX**

Handling & Storage Protect from freezing.

Other None

Shipping Information **Section X**

DOT Proper Shipping Name None

Hazard Class None

DOT Label(s) None

IATA Class: N/A Packing Group: N/A

IMDGC Class: N/A Packing Group: N/A

Prepared by: Carl N. Gilsdorf, Manager, Quality Assurance Date 12/21/88

This form has been prepared and reviewed by technically knowledgeable people and is based on information OMI International Corporation believes to be reliable. This information is provided solely to provide health and safety guidelines and is not to be intended for any other purpose.

* Sww 11

TECHNIC, INC.
MATERIAL SAFETY DATA SHEET

SECTION I — PRODUCT IDENTIFICATION

TRADE NAME (as labeled): TARNIBAN CONCENTRATE

CHEMICAL NAMES, COMMON NAMES: Butyl Carbitol, Perchloroethylene, Butyl Cellosolve, Lactic Acid

MANUFACTURER'S NAME & ADDRESS:
TECHNIC, INC.
1 SPECTACLE STREET
CRANSTON, RI 02910

NAME OF PREPARER: WILLIAM A. WILSON

DATE PREPARED: March 5, 1991

EMERGENCY PHONE: (401)781-6100

24 hour Emergency: Chem Trec 1-800-424-9300

SECTION II — HAZARDOUS INGREDIENTS

CHEMICAL NAMES	CAS NUMBER	PERCENT	EXPOSURE LIMITS
Butyl Carbitol $C_8H_{18}O_3$	112-34-5	< 5%	Skin: rabbit; LD_{50} = 4120 mg/kg Intraperitoneal: mouse; LD_{50} = 850 mg/kg
Perchloroethylene $C_2H_2Cl_4$	127-18-4	< 5%	Inhalation: human; TCL_0 = 96 ppm 7H ACGIH TLV: TWA = 50 ppm STEL = 200 ppm
Butyl Cellosolve $C_6H_{14}O_2$	111-76-2	< 10%	Inhalation: human; TCL_0 = 100 ppm ACGIH TLV: TWA = 25 ppm STEL = 75 ppm
Lactic Acid $C_3H_6O_3$	60-21-6	< 5%	Skin: rabbit; 500 mg/24H Oral: rabbit; LDL_0 = 500 mg/kg

Note: See page 3 for further information.

SECTION III — PHYSICAL PROPERTIES

VAPOR DENSITY (AIR=1)	Not known.	SPECIFIC GRAVITY:	30 - 40° Baume'
VAPOR PRESSURE (mm Hg)	Not known.	MELTING POINT (degrees F)	N.A.
EVAPORATION RATE (BUTYL ACETATE=1)	Not known.	BOILING POINT (degrees F)	300°
SOLUBILITY IN WATER:	Very soluble.		
APPEARANCE AND ODOR:	Yellow solution; rhubarb odor.		

SECTION IV. — FIRE AND EXPLOSION

FLASH POINT (° F) (METHOD USED): Non-flammable.

AUTOIGNITION TEMPERATURE, F. N.A.

FLAMMABLE LIMITS IN AIR, VOLUME %: LOWER LIMIT N.A. UPPER LIMIT N.A.

FIRE EXTINGUISHING MATERIALS:

X	WATER SPRAY		CARBON DIOXIDE		OTHER:
	FOAM		DRY CHEMICAL		

SPECIAL FIREFIGHTING PROCEDURES: None.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None.

EPORT NUMBER: 703 VAN WATERS & ROGERS INC. PAGE: 010
SDS NO: P1356 MATERIAL SAFETY DATA SHEET
FFECTIVE DATE: 01/08/92 VERSION: 010

RODUCT: TRISODIUM PHOSPHATE, VARIOUS GRADES

ORDER NO: 114029
PROD NO : 5036-7

S BELIEVED TO BE ACCURATE, VW&R MAKES NO REPRESENTATIONS AS TO ITS CCURACY OR SUFFICIENCY. CONDITIONS OF USE ARE BEYOND VW&R'S CONTROL AND HEREFORE USERS ARE RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN PERATING CONDITIONS TO DETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR ONDITIONS TO DETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR ARTICULAR PURPOSES AND THEY ASSUME ALL RISKS OF THEIR USE, HANDLING AND ISPOSAL OF THE PRODUCT, OR FROM THE PUBLICATION OR USE OF, OR RELIANCE PON, INFORMATION CONTAINED HEREIN. THIS INFORMATION RELATES ONLY TO THE RODUCT DESIGNATED HEREIN, AND DOES NOT RELATE TO ITS USE IN COMBINATION ITH ANY OTHER MATERIAL OR IN ANY OTHER PROCESS.

----------REVISION----------

)/89: ADDED NEW SYNONYM.

2/90: ADDED MOLECULAR WEIGHT, HMIS RATING, pH, % VOLATILE, ECOLOGICAL NFORMATION, AUTOIGNITION TEMPERATURE, OTHER REGULATORY INFORMATION - TSCA ECTION & DISCLAIMER.

2/90: REVISED CAS NUMBER.

)/90: ADDED: OTHER REGULATORY INFORMATION 1,2,3,4,5,8,9,10

EVISED: pH

'92: ADDED SYNONYM

 PRODUCT: TARNIBAN CONCENTRATE

SECTION V — HEALTH HAZARD INFORMATION

SYMPTOMS OF OVER-EXPOSURE FOR EACH POTENTIAL ROUTE OF EXPOSURE.

INHALATION: Narcotic effect, light-headed.

CONTACT WITH SKIN OR EYES: Irritant.

ABSORBED THROUGH SKIN: Removes fat from the skin. Irritant to skin.

SWALLOWED: Large amounts fatal. Small amounts affect the nervous system and liver.

HEALTH EFFECTS OR RISKS FROM EXPOSURE. EXPLAIN IN LAY TERMS. ATTACH EXTRA PAGE IF MORE SPACE IS NEEDED.

ACUTE:	Local:	Irritant - Moderate. May involve both irreversible and reversible changes; not severe enough to cause death or permanent injury.
	Systemic:	Ingestion - High. May cause death or permanent injury after very short exposure to small quantities. Inhalation, skin absorption - Moderate.
CHRONIC:	Local:	Irritant - Moderate.
	Systemic:	Ingestion, Inhalation, skin absorption - Moderate. May involve both irreversible and reversible changes; not severe enough to cause death or permanent injury.

FIRST AID: EMERGENCY PROCEDURES

EYE CONTACT: Flush with water (under lids) for 15 minutes or longer. Get immediate medical attention.

SKIN CONTACT: Remove contaminated clothing. Wash thoroughly with soap and water. Wash clothing before reuse. If irritation develops or persists, get medical attention.

INHALED: Remove patient to fresh air and provide oxygen if breathing is difficult; give artificial respiration if not breathing. Call physician.

SWALLOWED: If conscious give 2 glasses of water and induce vomiting by giving 30 ml (2 tbsp.) of syrup of Ipecac. Keep airway clear. Get immediate medical attention.

SUSPECTED CANCER AGENT? ____ NO __X__ YES EPA Carcinogen Assessment Group

SECTION VI — REACTIVITY DATA

STABILITY: __X__ STABLE ____ UNSTABLE

CONDITIONS TO AVOID: None.

INCOMPATIBILITY (MATERIALS TO AVOID): Strong acids, strong Redox materials.

HAZARDOUS DECOMPOSITION PRODUCTS (INCLUDING COMBUSTION PRODUCTS): Hydrogen Sulfide, Carbon Dioxide, Carbon Monoxide.

HAZARDOUS POLYMERIZATION: ____ MAY OCCUR __X__ WILL NOT OCCUR

CONDITIONS TO AVOID: None.

SECTION VII — SPILL, LEAK AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Prevent spread of spill. Neutralize by means of slow and careful aplication of a solution of soda ash and water. Absorb on clay or sawdust and shovel into container. Treat as solid waste at a proper hazardous waste site. Wash area after clean-up with water.

WASTE DISPOSAL: SHOULD BE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL ENVIRONMENTAL CONTROL REGULATIONS.

SECTION VIII — SPECIAL HANDLING INFORMATION

VENTILATION: Local exhaust required, mechanical recommended.

RESPIRATORY PROTECTION: In a major spill, use a NIOSH-approved mask (self-contained breathing apparatus).

EYE PROTECTION: Chemical goggles, face shield.

GLOVES: Rubber gloves.

OTHER CLOTHING AND EQUIPMENT: Acid resistant apron recommended or protective clothing.

WORK PRACTICES, HYGIENIC PRACTICES: Wash thoroughly before eating, drinking or smoking. Launder contaminated clothing.

OTHER HANDLING AND STORAGE REQUIREMENTS:

Store in tightly closed containers away from strong oxidizing and reducing agents.
Store in a cool, dry area away from heat and open flames.
Do not use container as a dilution or mixing vessel.
Use with adequate ventilation.
Avoid body contact with material.

Continued from page 1, SECTION II, HAZARDOUS INGREDIENTS.

This product is regulated as a toxic chemical under Section 313 of Title III/SARA, and 40 CFR, Part 372.
This product contains ingredient(s) known to the State of California to cause cancer.

Swww 11

EPORT NUMBER: 703 VAN WATERS & ROGERS INC. PAGE: 001
SDS NO: P1356 MATERIAL SAFETY DATA SHEET
FFECTIVE DATE: 01/08/92 VERSION: 010

ODUCT: TRISODIUM PHOSPHATE, VARIOUS GRADES

ORDER NO: 116899
PROD NO : 503547

CMW INC
70 GRAY ST.

INDIANAPOLIS,IN 46206

AN WATERS & ROGERS INC. , SUBSIDIARY OF UNIVAR (206)889-3400
100 CARILLON POINT , KIRKLAND , WA 98033

---------- EMERGENCY ASSISTANCE ----------

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

---------- FOR PRODUCT AND SALES INFORMATION ----------

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE AT
VW&R INDIANAPOLIS 317-547-4811 INDIANAPOLIS, IN

----------PRODUCT IDENTIFICATION----------

ODUCT NAME: TRISODIUM PHOSPHATE, VARIOUS GRADES CAS NO.: 7601-54-9 (ANHYDROUS) 60393-58-0 (HEMIHYDRATE) 10101-89-0 (DODECAHYDRATE)

MMON NAMES/SYNONYMS: TRISODIUM PHOSPHATE, ANHYDROUS, OR HEMIHYDRATE AND DODECAHYDRATE; EMULSI-PHOS 660 POWD; SODIUM PHOSPHATE TRIBASIC

MSDS #: P1356

RMULA: NA3PO4 PLUS WATER DATE ISSUED: 10/90

LECULAR WEIGHT: 164 (ANHYDROUS) SUPERCEDES: 02/90

ZARD RATING (MANUFACTURER) HMIS RATING

HEALTH: 2
FIRE: 0
REACTIVITY: 0
SPECIAL: NONE

HAZARD RATING SCALE
0=MINIMAL 3=SERIOUS
1=SLIGHT 4=SEVERE
2=MODERATE

HEALTH: 2
FIRE: 0
REACTIVITY: 0

REPORT NUMBER: 702 VAN WATERS & ROGERS INC. PAGE: 002
SDS NO: P1356 MATERIAL SAFETY DATA SHEET
EFFECTIVE DATE: 01/08/92 VERSION: 010

PRODUCT: TRISODIUM PHOSPHATE, VARIOUS GRADES

ORDER NO: 116809
PROD NO : 508647

HAZARDOUS INGREDIENTS

COMPONENT	CAS NO.	%	EXPOSURE LIMITS, PPM OSHA PEL	ACGIH TLV	OTHER LIMIT	HAZARD
TRISODIUM PHOSPHATE PLUS WATER	VARIOUS	<100	NONE	NONE	NONE	IRRITANT, CORROSIVE

PHYSICAL PROPERTIES

BOILING POINT, DEG F: NO DATA FOUND

MELTING POINT, DEG F: VARIES WITH GRADE

SPECIFIC GRAVITY (WATER=1): BULK DENSITY 0.8-1.0 pH: 11.9(1% SOLUTION) FOR TRISODIUM PHOSPHATE ANHYDROUS

VAPOR PRESSURE, (MM HG): NEGLIGIBLE WATER SOLUBILITY, %: 12-30%,DEPENDING ON GRADE

VAPOR DENSITY (AIR=1): NOT APPLICABLE
EVAPORATION RATE (BUTYL ACETATE=1): NOT APPLICABLE

VOLATILE (BY VOLUME): NO DATA AVAILABLE

APPEARANCE AND ODOR: WHITE POWDER OR CRYSTALS; NO ODOR.

FIRST AID MEASURES

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING

ODUCT: TRISODIUM PHOSPHATE, VARIOUS GRADES

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ATER FOR 15 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY.
ET IMMEDIATE MEDICAL ATTENTION.

N CASE OF SKIN CONTACT: IMMEDIATELY FLOOD SKIN WITH LOTS OF RUNNING
ATER FOR 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES. GET
EDICAL ATTENTION IF IRRITATION PERSISTS AFTER FLOODING. DESTROY
ONTAMINATED CLOTHING AND SHOES.

SWALLOWED: RINSE MOUTH WITH WATER. DO NOT INDUCE VOMITING.

TE TO PHYSICIAN:
STRONGLY ALKALINE, MAY REMOVE SEBACEOUS OILS LEAVING SKIN UNPROTECTED
D MAY CAUSE CHEMICAL BURNS. ACCESSIBLE EXPOSED TISSUES SHOULD BE
USHED THOROUGHLY WITH WATER, AND ANY CORNEAL BURNS WARRANT CONSULTATION
AN OPHTHALMOLOGIST.
INGESTION MAY RESULT IN NAUSEA, VOMITING, AND BURNS, ESPECIALLY OF THE
OPHAGUS. ATTEMPTS TO NEUTRALIZE INGESTED MATERIAL WITH ACIDS IS NOT
COMMENDED. THIS MAY CAUSE EXCESS HEAT AND GAS PRODUCTION WHICH CAN
CREASE THE RISK OF PERFORATION. DILUTION MAY DO LIKEWISE, BUT WHEN
E DRY MATERIAL IS INGESTED, ADHERENCE OF PARTICLES TO THE ESOPHAGEAL
COSA MAY ASSURE PERFORATION SO THAT IMMEDIATE DRINKING OF COLD WATER
MILK IS ADVISED. BURNS OF THE ESOPHAGUS AND/OR STOMACH SUFFICIENT
LEAD TO PERFORATION AND/OR STRICTURE FORMATION MAY OCCUR WITHOUT
OPHARYNGEAL BURNS. ACCORDINGLY, MOST AUTHORITIES RECOMMEND LIMITED

SOPHAGOSCOPY SUFFICIENT TO DETERMINE IF DEEP AND/OR CIRCUMFERENTIAL URNS ARE PRESENT, BECAUSE THEY ARE MOST LIKELY TO RESULT IN ESOPHAGEAL TENOSIS. PREVENTION OF THE LATTER IS CONTROVERSIAL, THOUGH MOST AUTH-RITIES FAVOR EARLY CORTICOSTEROID AND/OR PROPHYLACTIC DILATION THERAPY.

HEALTH HAZARD INFORMATION

RIMARY ROUTES OF EXPOSURE: SKIN OR EYE CONTACT, INHALATION.

IGNS AND SYMPTOMS OF EXPOSURE

INHALATION: BREATHING DUST MAY IRRITATE THE NOSE AND THROAT AND AUSE COUGHING AND CHEST DISCOMFORT.

EYE CONTACT: DUSTS WILL IRRITATE THE EYES AND PROLONGED CONTACT AY DAMAGE THE EYES.

SKIN CONTACT: BRIEF CONTACT MAY DRY THE SKIN. PROLONGED OR RE-EATED CONTACT MAY IRRITATE THE SKIN, CAUSING DERMATITIS.

SWALLOWED: STRONG IRRITATION OF MOUTH AND THROAT. CORROSIVE INJURIES OSSIBLE

HRONIC EFFECTS OF EXPOSURE: NO SPECIFIC INFORMATION AVAILABLE.

EDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE REPORTED.

RODUCT: TRISODIUM PHOSPHATE, VARIOUS GRADES

ORDER NO: 11608%
PROD NO : 503647

-----TOXICITY DATA-----

FOR ANHYDROUS PRODUCT:

:AL: RAT LD50 = 6.5 G/KG

RMAL: RABBIT LD50 > 300 MG/KG (SKIN ABSORPTION)

HALATION: NO DATA FOUND

RCINOGENICITY: THIS MATERIAL IS NOT CONSIDERED TO BE A CARCINOGEN
THE NATIONAL TOXICOLOGY PROGRAM, THE INTERNATIONAL AGENCY FOR
SEARCH ON CANCER, OR THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

HER DATA: NONE

-----ECOLOGICAL INFORMATION SECTION-----

DATA AVAILABLE

-----PERSONAL PROTECTION-----

NTILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MINIMIZING
ST EMISSIONS AT THE POINT OF USE.

SPIRATORY PROTECTION: IF USE CONDITIONS GENERATE DUSTS, WEAR A NIOSH-

)DUCT: TRISODIUM PHOSPHATE, VARIOUS GRADES

ORDER NO: 116889
PROD NO : 503647

'PROVED RESPIRATOR APPROPRIATE FOR THOSE EMISSION LEVELS. APPROPRIATE
:SPIRATORS MAY BE A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CART-

DGE RESPIRATOR WITH PARTICULATE FILTERS, A SELF-CONTAINED BREATHING

'PARATUS IN THE PRESSURE DEMAND MODE, OR A SUPPLIED-AIR RESPIRATOR.

'E PROTECTION: CHEMICAL GOGGLES UNLESS A FULL FACEPIECE RESPIRATOR IS

SO WORN. IT IS GENERALLY RECOGNIZED THAT CONTACT LENSES SHOULD NOT BE

IRN WHEN WORKING WITH CHEMICALS BECAUSE CONTACT LENSES MAY CONTRIBUTE

: THE SEVERITY OF AN EYE INJURY.

:OTECTIVE CLOTHING: LONG-SLEEVED SHIRT, TROUSERS, SAFETY SHOES, AND

.OVES.

'HER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE

'ARBY AND READY FOR USE.

----------FIRE AND EXPLOSION INFORMATION----------

'ASH POINT, DEG F: NON-COMBUSTIBLE FLAMMABLE LIMITS IN AIR, %

METHOD USED: NOT APPLICABLE LOWER: NOT APPLICABLE
UPPER: NOT APPLICABLE

AUTOIGNITION TEMPERATURE, DEG.F: NO DATA AVAILABLE

TINGUISHING MEDIA: THIS MATERIAL IS NOT COMBUSTIBLE. USE EXTINGUISHING

DIA APPROPRIATE FOR SURROUNDING FIRE.

ECIAL FIRE FIGHTING PROCEDURES: NONE.

ODUCT: TRISODIUM PHOSPHATE, VARIOUS GRADES

ORDER NO: 116869
PROD NO : 503647

JSUAL FIRE AND EXPLOSION HAZARDS: NONE.

----------HAZARDOUS REACTIVITY----------

ABILITY: STABLE POLYMERIZATION: WILL NOT OCCUR

NDITIONS TO AVOID: NONE

TERIALS TO AVOID: CORROSIVE TO ALUMINUM

ZARDOUS DECOMPOSITION PRODUCTS: NONE

----------SPILL, LEAK, AND DISPOSAL PROCEDURES----------

TION TO TAKE FOR SPILLS OR LEAKS: WEAR PROTECTIVE EQUIPMENT INCLUDING BBER BOOTS, RUBBER GLOVES, RUBBER APRON, AND A SELF-CONTAINED EATHING APPARATUS IN THE PRESSURE DEMAND MODE OR A SUPPLIED-AIR SPIRATOR. IF THE SPILL OR LEAK IS SMALL, A FULL FACEPIECE AIR- . RIFYING CARTRIDGE RESPIRATOR EQUIPPED WITH PARTICULATE FILTERS MAY BE TISFACTORY. IN ANY EVENT, ALWAYS WEAR EYE PROTECTION. FOR SMALL ILLS, SWEEP UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR RGE SPILLS, SHOVEL INTO DOT-APPROVED WASTE CONTAINERS. KEEP OUT OF WERS, STORM DRAINS, SURFACE WATERS, AND SOIL.

)MPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING,
)D HANDLING AND DISPOSAL OF WASTE.

ISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED
/ CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL.
)NSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO
SCERTAIN PROPER DISPOSAL PROCEDURES.

)TE: EMPTY CONTAINERS CAN HAVE RESIDUES, GASES AND MISTS AND ARE
)BJECT TO PROPER WASTE DISPOSAL, AS ABOVE.

----------SPECIAL PRECAUTIONS----------

'ORAGE AND HANDLING PRECAUTIONS: STORE IN A COOL, DRY, WELL-VENTILATED
.ACE AWAY FROM INCOMPATIBLE MATERIALS. KEEP BAGS OR FIBER DRUMS DRY AT
.L TIMES. WASH THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON
:IN, OR ON CLOTHING.

:PAIR AND MAINTENANCE PRECAUTIONS: NONE.

HER PRECAUTIONS: CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, WILL
TAIN PRODUCT RESIDUE AND VAPORS. ALWAYS OBEY HAZARD WARNINGS AND
NDLE EMPTY CONTAINERS AS IF THEY WERE FULL.

----------OTHER REGULATORY INFORMATION----------

EPORT NUMBER: 703 VAN WATERS & ROGERS INC. PAGE: 007
SDS NO: P1336 MATERIAL SAFETY DATA SHEET
FFECTIVE DATE: 01/08/92 VERSION: 010

ODUCT: TRISODIUM PHOSPHATE, VARIOUS GRADES

ORDER NO: 116809
PROD NO : 508647

CTION 313: NONE

OPOSITION 65: NONE

CTION 313 & PROP. 65: NONE

CTION 313 (WITH CHEMICALS LISTED): NONE

OPOSITION 65 (WITH CHEMICALS LISTED): NONE

SSACHUSETTS: NONE

NNSYLVANIA: UNDER THE PENNSYLVANIA RIGHT-TO-KNOW LAW, HAZARDOUS
BSTANCES AND SPECIAL HAZARDOUS SUBSTANCES COMPONENTS PRESENT IN THIS
ODUCT WHICH REQUIRE REPORTING ARE:

EMICAL(s)	CAS NO.	% WT.
ISODIUM PHOSPHATE	7601-54-9	< 100

LIFORNIA SCAQMD:

VOC: NONE VAPOR PRESSURE: NONE

CA: THE INGREDIENTS OF THIS PRODUCT ARE ON THE TSCA INVENTORY.

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EPORT NUMBER: 703 VAN WATERS & ROGERS INC. PAGE: 011
SDS NO: P1356 MATERIAL SAFETY DATA SHEET
FFECTIVE DATE: 01/08/92 VERSION: 010

RODUCT: TRISODIUM PHOSPHATE, VARIOUS GRADES

ORDER NO: 116867
PROD NO : 503647

FOR ADDITIONAL INFORMATION

CONTACT: MSDS COORDINATOR VW&R INDIANAPOLIS
DURING BUSINESS HOURS, PACIFIC TIME (206)889-3400

04/28/92 08:58 PRODUCT: 503647 CUST NO: 170750 ORDER NO: 116989

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* * * E N D O F M S D S * * *

SWMU # 11

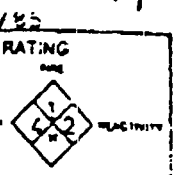
MATERIAL SAFETY DATA SHEET

Required under 29 CFR 1910, 1200

DATE PREPARED 9/25

EMERGENCY HAZARD RATING

4 - EXTREME
3 - HIGH
2 - MODERATE
1 - SLIGHT
0 - INSIGNIFICANT



CP CHEMICALS, Inc.
Arbor Street, Sewaren, NJ 07077 • 201-636-4300 • CHEMTREC 800-424-9300

*Keep away from acid and oxidizing agents

SECTION I - PRODUCTION INFORMATION: SINGLE SUBSTANCE ☒ MIXTURE ☐

Chemical Name & CAS No. CUPROUS CYANIDE; CUPRICIN CAS # [544-92-3]

Trade Name & Synonyms Copper Cyanide

RECEIVED DEC 19 1995 EVANSVILLE

Chemical Family	Insoluble Metallic Cyanides	Chemical Formula	CuCN

SECTION II - HAZARDOUS INGREDIENTS AND/OR CHARACTERISTICS

WARNING: POISON - Contact with acids liberates flammable and poisonous hydrogen cyanide (HCN) gas. Reacts vigorously with oxidizing agents.

Copper - 71%
Cyanogen (C_2N_2) - 29%

SECTION III - PHYSICAL DATA

Melting Point (°F)	475°C	Specific Gravity (H_2O=1)	2.9
Boiling Point (°F)	NA	Percent Volatile by Volume (%)	NA
Density (LBS/Per Cu/Ft.)	65	pH	NA

Solubility in Water Negligible

Appearance and Odor Off-white to cream powder, faint almond odor (toxic)

SECTION IV - REACTIVITY DATA

Stability		Conditions to Avoid
	Unstable	
	Stable X	

Incompatibility (Materials to Avoid) Acids and oxidizing materials

Hazardous Decomposition Products Hydrogen cyanide gas

Hazardous Polymerization			Conditions to Avoid
	May Occur	X	Acidification; HCN gas may polymerize violently.
	Will Not Occur		

SECTION V - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	NA	Flammable Limits	NA	LEL	UEL

Extinguishing Media Do not use CO_2. Use Alkaline dry chemical.

Special Fire Fighting Procedures Avoid flushing to sewer or stream; poisonous to humans and animals.

Unusual Fire and Explosion Hazards Contact with dilute acid will release toxic and flammable HCN gas.

ULRICH CHEMICAL, INC
3111 NORTH POST ROAD
INDIANAPOLIS, IN

SWMU # 11

SECTION VI - HEALTH HAZARD DATA

Exposure Limits — Cyanide (as CN), skin
TLV: 5 mg/m^3 TWA: 5 mg/m^3 Ceiling: NDA

Effects of Overexposure
Acute: Dizziness, confusion, headache, vomiting, loss of consciousness, death. Entry via eyes, nose, skin, mouth.
Chronic: NDA

Emergency First Aid Procedures: Seek medical assistance at once.

Eye: Wash with plenty of water (under lids) for 15 minutes, immediately.

Skin: Wash thoroughly with plenty of water. Remove contaminated clothing.

Inhalation: Remove to fresh air, have him lie down. Start treatment immediately with Cyanide First Aid Kit (amyl nitrite inhalant). Remove contaminated clothing.

Ingestion: Amyl nitrite inhalation, one ampule every 5 minutes. Keep victim warm. * Gastric lavage and/or catharsis should be delayed until antidotes given.

OTHER HEALTH INFORMATION:
LISTED: ☐ Carcinogen ☐ Teratogen ☐ Mutagen ☒ Other Not listed by NTP, IARC or OSHA as a carcinogen

SECTION VII - SPECIAL PROTECTION INFORMATION — PRODUCTION AND/OR MAINTENANCE OPERATIONS

Respiratory Protection (Specify Type): Respirators approved for cyanide dusts or mists.

Ventilation		
	Local Exhaust: Adequate ventilation	Special: Do not wear contact lenses.
	Mechanical (General): Exhaust fan	Other: Have on hand Cyanide first aid kit (Eli-Lilly NDC# 002-2362-OD)

Protective Gloves: Rubber gauntlet	Eye Protection: Chemical Safety glasses

Other Protective Equipment: Rubber boots, apron

SECTION VIII - SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled: Do not flush to sewer or stream. Cover with lime; pick up dry for disposal. Wash contaminated area with hypochlorite solution to oxidize residual cyanide.

Waste Disposal Method: As prescribed for cyanides and heavy metals by local, state, and federal regulations.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in Handling and Storing: Do not ship or store next to acids or oxidizing agents. Keep containers tightly closed. Avoid contact with eyes, skin or mucous membrane. Do not swallow. Keep solutions alkaline.

Other Precautions:

SECTION X - TRANSPORTATION DATA:

Proper Shipping Name	RQ	Hazard Class	ID # (49CFR 172-101)
COPPER CYANIDE	NA	POISON B	UN1587

Label Requirement: POISON PLACARD: POISON

Special Information: * Antidotes: Amyl Nitrite and sodium thiosulfate. (Lilly Cyanide First Aid Kit NDC#002-2362-OD)

NA = NOT APPLICABLE NDA = NO DATA AVAILABLE < = LESS THAN > = MORE THAN

FORM NO. 01/89

~~SWMU~~ * AOC 4

DATE 03/13/90 ACCT: 111671-01
INDEX 05900250050 CAT NO: S318S PO NBR: 75084

SODIUM HYDROXIDE, DRY SOLID, FLAKE, BEAD, OR GRANULAR
SODIUM HYDROXIDE, DRY SOLID, FLAKE, BEAD, OR GRANULAR
SODIUM HYDROXIDE, DRY SOLID, FLAKE, BEAD, OR GRANULAR

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY NUMBER: (201) 796-7100
CHEMTREC ASSISTANCE: (800) 424-9300

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 1310-73-2

SUBSTANCE: **SODIUM HYDROXIDE, DRY SOLID, FLAKE, BEAD, OR GRANULAR**

TRADE NAMES/SYNONYMS:
CAUSTIC SODA; SODA LYE; LYE; WHITE CAUSTIC; CAUSTIC SODA, BEAD; CAUSTIC SODA, DRY; CAUSTIC SODA, FLAKE; CAUSTIC SODA, GRANULAR; CAUSTIC SODA, SOLID; SODIUM HYDRATE; SODIUM HYDROXIDE (NA(OH)); SODIUM HYDROXIDE, FLAKE; SODIUM HYDROXIDE, DRY; SODIUM HYDROXIDE, SOLID; ASCARITE; SODIUM HYDROXIDE; STCC 4935235; UN 1823; S-318; S-318; S-320; S-612; NAOH; ACC21300

CHEMICAL FAMILY:
INORGANIC BASE

MOLECULAR FORMULA: NA-O-H

MOLECULAR WEIGHT: 40.00

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=1 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=1

COMPONENTS AND CONTAMINANTS

COMPONENT: SODIUM HYDROXIDE PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
SODIUM HYDROXIDE:
2 MG/M3 OSHA CEILING
2 MG/M3 ACGIH CEILING
2 MG/M3 NIOSH RECOMMENDED 15 MINUTE CEILING

1000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING (SOLUTION)

PHYSICAL DATA

DESCRIPTION: ODORLESS, WHITE OR OFF-WHITE HYGROSCOPIC SOLID.

BOILING POINT: 2534 F (1390 C) MELTING POINT: 604 F (318 C)

SPECIFIC GRAVITY: 2.130 VAPOR PRESSURE: 100 MMHG @ 1111 C

PH: 14 @ 5% SOLUTION SOLUBILITY IN WATER: 111 %

SOLVENT SOLUBILITY: SOLUBLE IN ALCOHOL, GLYCEROL; INSOLUBLE ACETONE, ETHER.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, HALON, WATER SPRAY OR STANDARD FOAM (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR STANDARD FOAM (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES

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INDEX 0540023000% CAT NO 5118% PO NBR 75089

WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM STORAGE TANK ENDS (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 60).

USE AGENT SUITABLE FOR TYPE OF FIRE. USE WATER IN FLOODING QUANTITIES AS FOG. APPLY WATER FROM AS FAR A DISTANCE AS POSSIBLE.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION §49CFR172.101:
CORROSIVE MATERIAL

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS §49CFR172.101 AND SUBPART E:
CORROSIVE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: §49CFR173.244
EXCEPTIONS: §49CFR173.244

TOXICITY

SODIUM HYDROXIDE:
IRRITATION DATA: 1%/24 HOURS EYE-MONKEY SEVERE; 500 MG/24 HOURS SKIN-RABBIT SEVERE; 1% EYE-RABBIT SEVERE; 50 UG/24 HOURS EYE-RABBIT SEVERE; 1 MG/24 HOUR EYE-RABBIT SEVERE; 400 UG EYE-RABBIT MILD; 100 MG RINSED EYE-RABBIT SEVERE.
TOXICITY DATA: 140-340 MG/KG ORAL-RAT LD50 (VAN WATERS & ROGERS INC. MSDS); 500 MG/KG ORAL-RABBIT LDLO; 1350 MG/KG SKIN-RABBIT LD50 (VAN WATERS & ROGERS INC. MSDS); 40 MG/KG INTRAPERITONEAL-MOUSE LD50; MUTAGENIC DATA (RTECS).
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: CORROSIVE- EYE, SKIN, MUCOUS MEMBRANES.
ACUTE TOXICITY LEVEL: TOXIC BY INGESTION; MODERATELY TOXIC BY DERMAL ABSORPTION.
TARGET EFFECTS: NO DATA AVAILABLE.

HEALTH EFFECTS AND FIRST AID

INHALATION:
SODIUM HYDROXIDE:
CORROSIVE. 250 MG/M3 IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
- ACUTE EXPOSURE- EFFECTS DUE TO INHALATION OF DUSTS OR MIST MAY VARY FROM MILD IRRITATION OF THE NOSE AT 2 MG/M3 TO SEVERE PNEUMONITIS DEPENDING ON THE SEVERITY OF EXPOSURE. LOW CONCENTRATIONS MAY CAUSE MUCOUS MEMBRANE IRRITATION WITH SORE THROAT, COUGHING, AND DYSPNEA. INTENSE EXPOSURES MAY RESULT IN DESTRUCTION OF MUCOUS MEMBRANES AND DELAYED PULMONARY EDEMA OR PNEUMONITIS. SHOCK MAY OCCUR.
- CHRONIC EXPOSURE- REPEATED EXPOSURES OF 5000 MG/L WERE HARMLESS TO RATS. BUT 10,000 MG/L LED TO NERVOUSNESS, SORE EYES, DIARRHEA AND RETARDED GROWTH. PROLONGED EXPOSURE TO HIGH CONCENTRATIONS OF DUSTS OR MISTS MAY CAUSE DISCOMFORT AND ULCERATION OF NASAL PASSAGES. RATS EXPOSED 30 MINUTES/DAY TO UNMEASURED CONCENTRATIONS OF SODIUM HYDROXIDE AEROSOLS SUFFERED PULMONARY DAMAGE AFTER 2-3 MONTHS. DEATH OCCURRED IN 2 OF 10 RATS EXPOSED TO AN AEROSOL OF 40% AQUEOUS SODIUM HYDROXIDE FOR 30 MINUTES, TWICE A WEEK FOR 3 WEEKS. HISTOPATHOLOGICAL EXAMINATION SHOWED MOSTLY NORMAL LUNG TISSUE WITH FOCI OF ENLARGED ALVEOLAR SEPTAE, EMPHYSEMA, BRONCHIAL ULCERATION, AND ENLARGED LYMPH ADENOIDAL TISSUES. AN EPIDEMIOLOGIC STUDY OF 291 WORKERS CHRONICALLY EXPOSED TO CAUSTIC DUSTS FOR 10 YEARS OR MORE FOUND NO SIGNIFICANT INCREASE IN MORTALITY IN RELATION TO DURATION OR INTENSITY OF SUCH EXPOSURES.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
SODIUM HYDROXIDE:
CORROSIVE.
- ACUTE EXPOSURE- UPON CONTACT WITH THE SKIN, DAMAGE INCLUDING REDNESS, CUTANEOUS BURNS, SKIN FISSURES AND WHITE ESCHARS MAY OCCUR WITHOUT IMMEDIATE PAIN. EXPOSURE TO SOLUTIONS AS WEAK AS 0.03 N (0.12%) FOR 1 HOUR HAS CAUSED INJURY TO HEALTHY SKIN. SOLUTIONS OF 25-50% CAUSED NO SENSATION OF IRRITATION WITHIN 3 MINUTES IN HUMAN SUBJECTS. WITH SOLUTIONS OF 0.9-4%, IRRITATION DOES NOT OCCUR UNTIL AFTER SEVERAL HOURS. SKIN BIOPSIES FROM HUMAN SUBJECTS HAVING 1 N SODIUM HYDROXIDE APPLIED TO THEIR ARMS FOR 15 TO 180 MINUTES SHOWED PROGRESSIVE CHANGES BEGINNING WITH DISSOLUTION OF THE CELLS IN THE HORNY LAYER AND PROGRESSING THROUGH EDEMA TO TOTAL DESTRUCTION OF THE EPIDERMIS IN 60 MINUTES. A 5% AQUEOUS SOLUTION CAUSED SEVERE NECROSIS TO THE SKIN OF RABBITS WHEN APPLIED FOR 4 HOURS. ALKALIES PENETRATE THE SKIN SLOWLY. THE EXTENT OF INJURY DEPENDS ON THE DURATION OF CONTACT. IF SODIUM HYDROXIDE IS NOT REMOVED FROM THE SKIN, SEVERE BURNS WITH DEEP ULCERATION MAY OCCUR. EXPOSURE TO THE DUST OR MIST MAY CAUSE MULTIPLE SMALL BURNS AND TEMPORARY LOSS OF HAIR. PATHOLOGIC FINDINGS DUE TO ALKALIES MAY INCLUDE GELATINOUS, NECROTIC AREAS AT THE SITE OF CONTACT.
- CHRONIC EXPOSURE- EFFECTS ARE DEPENDENT UPON CONCENTRATION AND DURATION OF EXPOSURE. DERMATITIS OR EFFECTS SIMILAR TO THOSE FOR ACUTE EXPOSURE

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MAY OCCUR.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
SODIUM HYDROXIDE:
CORROSIVE.
ACUTE EXPOSURE- CONTACT MAY CAUSE DISINTEGRATION AND SLOUGHING OF CONJUNCTIVAL AND CORNEAL EPITHELIUM, CORNEAL OPACIFICATION, MARKED EDEMA AND ULCERATION. AFTER 7 TO 13 DAYS EITHER GRADUAL RECOVERY BEGINS OR THERE IS PROGRESSION OF ULCERATION AND CORNEAL OPACIFICATION. COMPLICATIONS OF SEVERE EYE BURNS ARE SYMBLEPHARON WITH OVERGROWTH OF THE CORNEA BY A VASCULARIZED MEMBRANE, PROGRESSIVE OR RECURRENT CORNEAL ULCERATION AND PERMANENT CORNEAL OPACIFICATION. BLINDNESS MAY OCCUR.
CHRONIC EXPOSURE- EFFECTS ARE DEPENDENT UPON CONCENTRATION AND DURATION OF EXPOSURE. CONJUNCTIVITIS OR EFFECTS SIMILAR TO THOSE FOR ACUTE EXPOSURE MAY OCCUR.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). CONTINUE IRRIGATING WITH NORMAL SALINE UNTIL THE PH HAS RETURNED TO NORMAL (30-60 MINUTES). COVER WITH STERILE BANDAGES. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
SODIUM HYDROXIDE:
CORROSIVE/TOXIC.
ACUTE EXPOSURE- THE REPORTED LETHAL DOSE IN RATS IS 140-340 MG/KG. INGESTION MAY CAUSE A BURNING SENSATION IN THE MOUTH, CORROSION OF THE LIPS, MOUTH, TONGUE AND PHARYNX, AND SEVERE ESOPHAGEAL AND ABDOMINAL PAIN, VOMITING OF BLOOD AND LARGE PIECES OF MUCOSA, AND BLOODY DIARRHEA. ASPHYXIA CAN OCCUR FROM SWELLING OF THE THROAT, MEDIASTINITIS, ALKALEMIA, PALLOR, WEAK, SLOW PULSE, CARDIOVASCULAR COLLAPSE, SHOCK, COMA AND DEATH MAY OCCUR. PERFORATION OF THE ALIMENTARY TRACT AND CONSTRICTIVE SCARRING MAY RESULT. ESOPHAGEAL STRICTURE MAY OCCUR WEEKS, MONTHS, OR EVEN YEARS LATER TO MAKE SWALLOWING DIFFICULT. THE ESTIMATED FATAL DOSE IN MAN IS 5 GRAMS. CASES OF SQUAMOUS CELL CARCINOMA OF THE ESOPHAGUS HAVE OCCURRED WITH LATENT PERIODS OF 12 TO 42 YEARS AFTER INGESTION. THESE CANCERS WERE BELIEVED TO BE SEQUELA OF TISSUE DESTRUCTION AND POSSIBLY SCAR FORMATION RATHER THAN THE RESULT OF DIRECT CARCINOGENIC ACTION OF SODIUM HYDROXIDE.
CHRONIC EXPOSURE- DEPENDING ON THE CONCENTRATION, REPEATED INGESTION OF ALKALINE SUBSTANCES MAY RESULT IN INFLAMMATORY AND ULCERATIVE EFFECTS ON THE ORAL MUCOUS MEMBRANES AND OTHER EFFECTS AS WITH ACUTE INGESTION.

FIRST AID: DO NOT USE GASTRIC LAVAGE OR EMESIS. DILUTE THE ALKALI BY GIVING WATER OR MILK TO DRINK IMMEDIATELY AND ALLOWING VOMITING TO OCCUR. AS SOON AS POSSIBLE, HAVE QUALIFIED MEDICAL PERSONNEL DO ESOPHAGOSCOPY AND IRRIGATE INJURED AREAS WITH 1% ACETIC ACID UNTIL THE ALKALI IS COMPLETELY NEUTRALIZED. (DREISBACH, HANDBOOK OF POISONING, 11TH EDITION). GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:
REACTS EXOTHERMICALLY WITH WATER.

INCOMPATIBILITIES:
SODIUM HYDROXIDE:
ACETALDEHYDE: MAY RESULT IN VIOLENT POLYMERIZATION.
ACETIC ACID: MIXING IN CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
ACETIC ANHYDRIDE: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
ACIDS: MAY REACT VIOLENTLY.
ACROLEIN: MAY RESULT IN AN EXTREMELY VIOLENT POLYMERIZATION.
ACRYLONITRILE: MAY CAUSE VIOLENT POLYMERIZATION.
ALLYL ALCOHOL + BENZENE SULFONYL CHLORIDE: POSSIBLE EXPLOSION HAZARD.
ALLYL CHLORIDE: HYDROLYZES.
ALUMINUM: VIGOROUS REACTION.
ALUMINUM, ARSENIC TRIOXIDE, SODIUM ARSENATE: MAY GENERATE FLAMMABLE HYDROGEN GAS.
AMMONIA AND SILVER NITRATE: PRECIPITATION OF EXPLOSIVE SIVLER NITRIDE MAY OCCUR.
AMMONIUM SALTS: MAY REACT VIOLENTLY EVOLVING AMMONIA GAS.
BENZENE-1,4-DIOL: EXOTHERMIC REACTION.
N,N'-BIS(TRINITROETHYL)UREA: FORMATION OF EXPLOSIVE COMPOUND.
BROMINE: POSSIBLE EXPLOSION IF NOT STIRRED CONTINOUSLY.
CHLORINE TRIFLUORIDE: MAY CAUSE VIOLENT REACTION.
CHLOROFORM AND METHYL ALCOHOL: EXOTHERMIC REACTION.
CHLOROHYDRIN: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
4-CHLORO-2-METHYLPHENOL: POSSIBLE IGNITION.

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CHLORONITROTOLUENES: POSSIBLE EXPLOSION
CHLOROPICRIN: MAY CAUSE VIOLENT REACTION.
CHLOROSULFONIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
CINNAMALDEHYDE: EXOTHERMIC REACTION.
COATINGS: MAY BE ATTACKED.
CYANOGEN AZIDE: MAY FORM SODIUM 5-AZIDOTETRAZOLIDE, WHICH IS EXPLOSIVE IF ISOLATED.
2,2-DICHLORO-3,3-DIMETHYLBUTANE: HAZARDOUS REACTION.
1,2-DICHLOROETHYLENE: MAY FORM SPONTANEOUSLY FLAMMABLE MONOCHLOROACETYLENE.
DIBORANE AND OCTANAL OXIME: EXOTHERMIC REACTION.
ETHYLENE CYANOHYDRIN: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
FLAMMABLE LIQUIDS: FIRE AND EXPLOSION HAZARD.
GLYCOLS: MAY CAUSE EXOTHERMIC DECOMPOSITION WITH EVOLUTION OF HYDROGEN GAS.
GLYOXAL: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
HALOGENATED HYDROCARBONS: VIOLENT REACTION.
HYDROCHLORIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
HYDROFLUORIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
HYDROQUINONE: RAPID DECOMPOSITION OF HYDROQUINONE WITH EVOLUTION OF HEAT.
LEAD: MAY BE ATTACKED, FLAMMABLE HYDROGEN GAS MAY BE LIBERATED.
LEATHER: MAY BE ATTACKED.
MALEIC ANHYDRIDE: EXPLOSIVE DECOMPOSITION.
METALS: CORRODES METALS, REACTING TO FORM FLAMMABLE HYDROGEN GAS.
4-METHYL-2-NITROPHENOL: EXOTHERMIC REACTION.
NITRIC ACID: MIXING IN CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
NITROBENZENE: POSSIBLY EXPLOSIVE REACTION UPON HEATING IN PRESENCE OF WATER.
NITROETHANE: FORMS AN EXPLOSIVE SALT.
NITROMETHANE: FORMS AN EXPLOSIVE SALT.
NITROPARAFFINS: THE NITROPARAFFINS, IN THE PRESENCE OF WATER, FORM DRY SALTS WITH ORGANIC BASES. THE DRY SALTS ARE EXPLOSIVE.
NITROPROPANE: FORMS AN EXPLOSIVE SALT.
O-NITROTOLUENE: POSSIBLE EXPLOSION.
OLEUM: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
ORGANIC PEROXIDES: INCOMPATIBLE.
PENTOL (3-METHYL-2-PENTENE-4-YN-1-OL): POSSIBLE EXPLOSION.
PHOSPHORUS: MAY FORM MIXED PHOSPHINES WHICH MAY IGNITE SPONTANEOUSLY IN AIR.
PHOSPHORUS PENTOXIDE: MAY REACT VIOLENTLY WHEN HEATED.
PLASTICS: MAY BE ATTACKED.
B-PROPIOLACTONE: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
PROPYLENE OXIDE: IGNITION OR EXPLOSION MAY OCCUR.
RUBBER: MAY BE ATTACKED.
SODIUM TETRAHYDROBORATE: DRY MIXTURES WITH SODIUM HYDROXIDE CONTAINING 15-98% OF TETRAHYDROBORATE LIBERATE HYDROGEN EXPLOSIVELY AT 230-270 C.
SULFURIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERAURE AND PRESSURE.
1,2,4,5-TETRACHLOROBENZENE: VIOLENT REACTION.
TETRACHLOROBENZENE + METHYL ALCOHOL: POSSIBLE EXPLOSION.
TETRACHLOROETHYLENE: POSSIBLE EXPLOSION.
TETRAHYDROFURAN: SERIOUS EXPLOSIONS CAN OCCUR.
TIN: EVOLUTION OF HYDROGEN GAS WHICH MAY FORM AN EXPLOSIVE MIXTURE.
1,1,1-TRICHLOROETHANOL: EXPLOSION MAY OCCUR.
TRICHLOROETHYLENE: FORMATION OF EXPLOSIVE MIXTURES OF DICHLOROACETYLENE.
TRICHLORONITROMETHANE + METHANOL: MAY CAUSE VIOLENT REACTION.
WOOL: MAY BE ATTACKED.
ZINC (DUST): FIRE AND EXPLOSION HAZARD.
ZIRCONIUM: MAY CAUSE EXPLOSIVE REACTION UPON HEATING.

DECOMPOSITION:
THERMAL DECOMPOSITION MAY RELEASE TOXIC FUMES OF SODIUM OXIDE.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

PROTECT AGAINST PHYSICAL DAMAGE. STORE IN A DRY PLACE; PROTECT AGAINST MOISTURE AND WATER. SEPARATE FROM ACIDS, METALS, EXPLOSIVES, ORGANIC PEROXIDES, AND EASILY IGNITABLE MATERIALS (NFPA 49, HAZARDOUS CHEMICALS DATA, 1975).

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

DISPOSAL

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DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER D002.

100 POUND CERCLA SECTION 103 REPORTABLE QUANTITY.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. FLAMMABLE. POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. MAY IGNITE COMBUSTIBLES (WOOD, PAPER, OIL, ETC.).

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

USE PROTECTIVE COVER SUCH AS A PLASTIC SHEET TO PREVENT MATERIAL FROM DISSOLVING IN FIRE EXTINGUISHING WATER OR RAIN.

WATER SPILL:
ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

REPORTABLE QUANTITY (RQ): 1000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29CFR1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

SODIUM HYDROXIDE:

50 MG/M3- ANY POWERED AIR-PURIFYING RESPIRATOR WITH A DUST AND MIST FILTER.
ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.

100 MG/M3- ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH EFFICIENCY PARTICULATE FILTER.

250 MG/M3- ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH EFFICIENCY PARTICULATE FILTER.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

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EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:
WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC, INC.
CREATION DATE: 12/17/84 REVISION DATE: 09/06/89

-ADDITIONAL INFORMATION-
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POTASSIUM HYDROXIDE USP PELLET REVISION OF: 07-21-87

* Acc 4

MAIL TO:

84090433
C.M.W. INC
70 GRAY ST
PO BOX 2266
INDIANAPOLIS IN 46206
ATTN:

ORDER NO: 848002682
PROD NO: 04523102

VAN WATERS & ROGERS INC. 2600 CAMPUS DRIVE SAN MATEO, CA 94403

EMERGENCY ASSISTANCE

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL CHEMTREC (800) 424-9300.

FOR PRODUCT AND SALES INFORMATION

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE

PRODUCT IDENTIFICATION

PRODUCT NAME: POTASSIUM HYDROXIDE DRY CAS NO.: 1310-58-3
COMMON NAMES/SYNONYMS: CAUSTIC POTASH VW&R CODE: T1576
DRY

FORMULA: KOH DATE ISSUED: 09/85
HAZARD RATING (NFPA 704) SUPERCEDES: 11/85
HEALTH: 3 HAZARD RATING SCALE:
FIRE: 0 0=MINIMAL 3=SERIOUS
REACTIVITY: 1 1=SLIGHT 4=SEVERE
SPECIAL: NONE 2=MODERATE

HAZARDOUS INGREDIENTS

COMPONENT	%	EXPOSURE LIMITS, MG/M3 OSHA PEL	ACGIH TLV	OTHER LIMIT	HAZARD
POTASSIUM HYDROXIDE	85 AND 90	NONE	2	NONE	CORROSIVE; TOXIC

PHYSICAL PROPERTIES

BOILING POINT, DEG F: 2500 VAPOR PRESSURE, MM HG/20 DEG C: N/A
MELTING POINT, DEG F: 715 VAPOR DENSITY (AIR=1): N/A
SPECIFIC GRAVITY (WATER=1): 2.044 WATER SOLUBILITY, %: 52.8
APPEARANCE AND ODOR: EVAPORATION RATE (BUTYL ACETATE=1): N/A
WHITE HYGROSCOPIC FLAKE OR PELLET, NO ODOR

FIRST AID MEASURES

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING WATER FOR 30 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF SKIN CONTACT: IMMEDIATELY FLUSH SKIN WITH LOTS OF RUNNING WATER FOR 30 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH

[illegible] MEDICAL ATTENTION

SWALLOWED: DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE LOTS OF WATER [illegible] MILK. GET IMMEDIATE MEDICAL ATTENTION. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON.

---HEALTH HAZARD INFORMATION---

PRIMARY ROUTES OF EXPOSURE: SKIN OR EYE CONTACT

SIGNS AND SYMPTOMS OF EXPOSURE

INHALATION: DUSTS ARE EXTREMELY CORROSIVE TO THE ENTIRE RESPIRATORY TRACT. BREATHING DUST CAN DESTROY THE MUCOUS MEMBRANES AND CAN CAUSE SEVERE PNEUMONITIS.

EYE CONTACT: DUSTS ARE EXTREMELY CORROSIVE TO THE EYES. BRIEF CONTACT CAUSES SEVERE EYE DAMAGE AND PROLONGED CONTACT CAUSES PERMANENT EYE INJURY WHICH MAY BE FOLLOWED BY BLINDNESS.

SKIN CONTACT: DUSTS ARE EXTREMELY CORROSIVE TO THE SKIN AND RAPIDLY CAUSE SEVERE CHEMICAL BURNS. MOISTURE ON THE SKIN, SUCH AS FROM PERSPIRATION, WILL ACCELERATE TISSUE DESTRUCTION.

SWALLOWED: DUSTS OR SOLIDS ARE EXTREMELY CORROSIVE TO THE MOUTH AND THROAT. SWALLOWING DUSTS OR SOLIDS CAUSES SEVERE AND RAPID BURNING OF THE MOUTH, THROAT, AND DIGESTIVE TRACT ACCOMPANIED BY SEVERE PAIN, VOMITING AND COLLAPSE. SOME EFFECTS MAY BE DELAYED.

CHRONIC EFFECTS OF EXPOSURE: MAY RESULT IN AREAS OF DESTRUCTION OF SKIN TISSUE OR PRIMARY IRRITANT DERMATITIS. SIMILARLY, INHALATION OF DUSTS, VAPORS, OR MISTS MAY CAUSE VARYING DEGREES OF DAMAGE TO THE AFFECTED TISSUES AND ALSO INCREASING SUSCEPTIBILITY TO RESPIRATORY ILLNESS.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE KNOWN.

---TOXICITY DATA---

ORAL: NO DATA FOUND FOR SOLID CAUSTIC POTASH BUT 45% LIQUID RAT LD50=205 MG/KG

DERMAL: NO DATA FOUND FOR SOLID CAUSTIC POTASH BUT 45% LIQUID RABBIT LD50=>1260 MG/KG

INHALATION: NO DATA FOUND

CARCINOGENICITY: THIS MATERIAL IS NOT CONSIDERED TO BE A CARCINOGEN BY THE NATIONAL TOXICOLOGY PROGRAM, THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, OR THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OTHER DATA: 5 MG/24HR PRODUCED MODERATE IRRITATION TO RABBIT SKIN. 1 MG/24HR PRODUCED MODERATE IRRITATION TO RABBIT EYE.

---PERSONAL PROTECTION---

VENTILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MINIMIZING DUST EMISSIONS AT THE POINT OF USE.

RESPIRATORY PROTECTION: NIOSH-APPROVED DUST RESPIRATOR OR MASK IN THE ABSENCE OF ADEQUATE ENVIRONMENTAL CONTROLS AT THE POINT OF USE.

EYE PROTECTION: CHEMICAL GOGGLES AND FULL FACE SHIELD.

PROTECTIVE CLOTHING: ALKALI-RESISTANT SLICKER SUIT WITH RUBBER APRON, RUBBER BOOTS WITH PANTS OUTSIDE, AND RUBBER GLOVES WITH GAUNTLETS.

OTHER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE NEARBY AND READY FOR USE.

---FIRE AND EXPLOSION INFORMATION---

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FLAMMABLE LIMITS IN AIR, %
LOWER: N/A UPPER: N/A
... IS NOT COMBUSTIBLE. CONTACT WITH WATER MAY GENERATE ENOUGH HEAT TO IGNITE COMBUSTIBLE MATERIALS.

SPECIAL FIRE FIGHTING PROCEDURES: NONE

UNUSUAL FIRE AND EXPLOSION HAZARDS: THIS MATERIAL MELTS AT 715 DEG F. HOT MOLTEN MATERIAL WILL REACT VIOLENTLY WITH WATER RESULTING IN SPATTERING AND FUMING. IN THE MOLTEN STATE THIS PRODUCT WILL REACT WITH METALS SUCH AS ALUMINUM, TIN, OR ZINC TO PRODUCE FLAMMABLE HYDROGEN GAS.

HAZARDOUS REACTIVITY

STABILITY: STABLE POLYMERIZATION: WILL NOT OCCUR
CONDITIONS TO AVOID: KEEP WATER AND MOIST AIR OUT OF THE CONTAINER.

MATERIALS TO AVOID: ACIDS, COMBUSTIBLE MATERIALS, AND METALS SUCH AS ALUMINUM, TIN, GALVANIZED ZINC, BRASS, AND BRONZE. AVOID CONTACT WITH TRICHLOROETHYLENE TO PREVENT SPONTANEOUS FORMATION OF FLAMMABLE DICHLOROACETYLENE.

HAZARDOUS DECOMPOSITION PRODUCTS: NONE

SPILL, LEAK, AND DISPOSAL PROCEDURES

ACTION TO TAKE FOR SPILLS OR LEAKS: WEAR PROTECTIVE EQUIPMENT INCLUDING RUBBER BOOTS, RUBBER GLOVES, RUBBER APRON, AND CHEMICAL GOGGLES. FOR SMALL SPILLS, SWEEP UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR LARGE SPILLS, SHOVEL INTO DOT-APPROVED WASTE CONTAINERS. COMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING, AND HANDLING AND DISPOSAL OF WASTE.

DISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED IN CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. CONSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES.
NOTE: EMPTY CONTAINERS CAN HAVE RESIDUES, GASES AND MISTS AND ARE SUBJECT TO PROPER WASTE DISPOSAL, AS ABOVE.

SPECIAL PRECAUTIONS

STORAGE AND HANDLING PRECAUTIONS: STORE IN A COOL, DRY PLACE. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE. DO NOT USE PRESSURE TO EMPTY CONTAINER. WASH THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

REPAIR AND MAINTENANCE PRECAUTIONS: DO NOT CUT, GRIND, WELD, OR DRILL ON OR NEAR THIS CONTAINER.

OTHER PRECAUTIONS: CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, WILL RETAIN PRODUCT RESIDUE AND VAPORS. ALWAYS OBEY HAZARD WARNINGS AND HANDLE EMPTY CONTAINERS AS IF THEY WERE FULL. THIS MATERIAL GENERATES CONSIDERABLE HEAT WHEN DISSOLVED IN WATER. WHEN MIXING WITH WATER ALWAYS ADD CAUSTIC POTASH SLOWLY TO WATER AND STIR CONTINUOUSLY. NEVER ADD WATER TO CAUSTIC POTASH.

OTHER PRECAUTIONS: THIS PRODUCT IS INTENDED FOR USE IN FOOD, ANIMAL FEED, DRUG, OR COSMETIC MANUFACTURE AND IT HAS BEEN PRODUCED AND PACKAGED IN ACCORDANCE WITH STRICT QUALITY PRACTICES. MAINTAIN THIS QUALITY LEVEL BY STORING THIS PRODUCT AWAY FROM OTHER CHEMICALS, HANDLING IT WITH CARE, AND AVOIDING ALL SOURCES OF CONTAMINATION.

FOR ADDITIONAL INFORMATION

CONTACT DOUGLAS EISNER, TECHNICAL DIRECTOR, VAN WATERS & ROGERS INC. DURING BUSINESS HOURS, PACIFIC TIME (415)573-8000

NOTICE

[illegible] DISCLAIMS ALL EXPRES
[illegible] FOR A PARTICULAR
[illegible] OF INFORMATION PROVIDED HEREIN **

ALL INFORMATION APPEARING HEREIN IS BASED UPON DATA OBTAINED FROM THE MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES. WHILE THE INFORMATION IS BELIEVED TO BE ACCURATE, VWR MAKES NO REPRESENTATIONS AS TO ITS ACCURACY OR SUFFICIENCY. CONDITIONS OF USE ARE BEYOND VWR'S CONTROL AND THEREFORE USERS ARE RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN OPERATING CONDITIONS TO DETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR PARTICULAR PURPOSES AND THEY ASSUME ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM THE PUBLICATION OR USE OF, OR RELIANCE UPON, INFORMATION CONTAINED HEREIN. THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER PROCESS.

----------REVISION----------

02/86 REVISED FIRST AID MEASURES.

**** E N D O F M S D S ****

PROD: 04523102 IS 09:53 27 FEB 1988 CUST: 84090433 INVOICE: 848002688

OMI INTERNATIONAL CORPORATION
21441 Hoover Road, Warren, MI 48089

24-Hour EMERGENCY Phone Number
313-497-9129

REVISION: 5/13/86

MATERIAL SAFETY DATA SHEET

* ADC 4

May be used to comply with OSHA's Hazard Communication Standard, 29CFR 1910 1200. Standard must be consulted for specific requirements.

Section I

Product Trade Name: UDYLITE: UDYPREP® 268
Proprietary Formulation

Section II

Hazardous Components	CAS No.	Percentage	TLV OSHA ACGIH	Listed: NTP/IARC/OSHA Z/EPA (Carcinogen/hazardous/toxic/mutagen/teratogen)
Sodium Hydroxide	1310-73-2	50 to 60	2 mg/M³	OSHA Z H
Tetrasodium Pyrophosphate	7722-88-5	5	N/A	N/A

Section III

Physical Data

Appearance and Odor: White granular powder with no odor.

Solubility in Water:		Boiling Point	N/A
Negligible	<0.1%	Vapor Pressure	N/A
Slight	0.1-1.0%	Percent Volatile by Volume	N/A
Moderate	1.0-10.0%	Evaporation Rate	N/A
Appreciable	>10.0% X	Specific Gravity	N/A
Complete(all proportions)		pH	N/A

Section IV

Fire and Explosion Hazard Data

Flash Point (method used): None — Flammable/Explosive Limits LEL N/A UEL N/A

NFPA Code (0-4): Health 2 Flammability 0 Reactivity 1

Extinguishing Media: Product will not burn. Use media suitable for surrounding fire.

Special Fire-Fighting Procedures: Wear self-contained breathing apparatus and full protective clothing.

Unusual Fire and Explosion Hazards: May react violently with water.

Section V

Health Hazard Data

Threshold Limit Value: None known or established.

Effects of Overexposure:

Acute: Corrosive to eyes, skin and mucous membranes.

Chronic: Corrosive to eyes, skin and mucous membranes.

Principal Route of Exposure: Skin contact, ingestion, inhalation.

Emergency First Aid Procedures:

Eye: Flush with a directed stream of water for 15 minutes while forcibly holding eyelid open. Seek medical attention.

Skin: Immediately flush with water. Seek medical attention.

Inhalation: Remove to fresh air. Seek medical attention.

Swallowing: Dilute by drinking 3-4 glasses of water. Do not induce vomiting. Seek medical attention.

Product Trade Name UDYPREP® 268

Reactivity Data — Section VI

Stability: Stable X Unstable ____

Incompatibility (Materials to Avoid): Strong acids

Hazardous Decomposition Products: None known

Hazardous Polymerization May Occur ____ Will Not Occur X

Spill or Leak Procedures — Section VII

Steps to be taken in case material is released or spilled:
Neutralize with dilute acid, absorb with inert absorbent, contain and place into a lined container properly labeled for disposal.

Waste Disposal Method: Licensed waste treatment facility.

EPA I.D. Number: D002 RQ: (100/45.4)

Special Protection Information — Section VIII

Ventilation:
Local Exhaust: Yes Respiratory Protection: NIOSH dust mask

Protective Clothing:
Gloves: butyl rubber or neoprene Boots: Yes
Chemical Safety Goggles: Yes Other: full protective clothing
Full Face Shield: Yes

Note: Eye Fountain and Safety Shower must always be available.

Special Precautions — Section IX

Handling & Storage: Store away from acids.

Other: Keep dry.

Shipping Information — Section X

DOT Proper Shipping Name: Corrosive Solids, NOS UN 1759
Hazard Class: Corrosive Material
DOT Label(s): Corrosive 8
IATA Class: 8 Packing Group: II
IMDGC Class: 8 Packing Group: II

Prepared by: Carl N. Gilsdorf, Manager, Quality Assurance Date 5/13/86

This form has been prepared and reviewed by technically knowledgeable people and is based on information OMI International Corporation believes to be reliable. This information is provided solely to provide health and safety guidelines and is not to be intended for any other purpose.

APPENDIX E

CMW WASTE WATER PERMIT AND SELF-MONITORING RESULTS

STATE OF INDIANA)
) SS:
COUNTY OF MARION)

IN THE MUNICIPAL COURT OF MARION COUNTY, ROOM NO. E12
Cause No. 49F1290050V-0966

CITY OF INDIANAPOLIS)
Plaintiff,)
-vs-)
CMW, Inc.,)
Defendant.)

FILED
July 16 1990
Faye L. Mowery

AGREED JUDGMENT AND FINE

The Parties to this Cause hereby agree as follows that:

1. Defendant waives the right to trial or hearing in this Cause.

2. Defendant admits the Ordinance violations alleged in the Complaint.

3. Defendant further specifically admits that on November 2 and 6, and December 5 and 20, 1989, the wastewater discharged from the facility located at 70 S. Gray Street, Indianapolis, Indiana, was outside the acceptable pH range specified in Section 27-4(c)(2) of the Municipal Code of Indianapolis and Marion County, Indiana and Industrial Discharge Permit #362301.

4. Defendant is the holder of Industrial Discharge Permit #362301, which was in full force and effect at the time of the above specified violations.

5. Defendant agrees to provide, in a timely manner, any information deemed necessary by the Director of the Department of Public Works needed to draft and issue a modified industrial discharge permit incorporating standards promulgated in 40 CFR 471 - Nonferrous Metals Forming Point Source Category.

6. Defendant further agrees to install flow measuring equipment, or an alternate fl[redacted] approved by the Director, to verify discharge volumes at permitted outfalls.

7. Defendant agrees to pay Court costs in the amount of ($53.00), plus a fine of One Thousand Dollars ($1,000.00), imposed by the Court as a civil penalty for the violations which the Defendant admits herein.

Industrial Discharger

Compliance Schedule Monitoring

Background Information

Name: CONTACTS METALS WELDING, INC. (CMW)

Address: 70 S. Gray Street 46201

Mailing Address: P.O. Box 2266 46206

Contact: Will Hamilton, Dir. Plant Eng. Phone: 634-8884

Contact: _____ Phone: _____

Compliance Schedule Information

Date Issued: 07/16/90

Commencement Date: N/A

Completion Date: N/A

Reason Required: Agreed Judgement ordering installation of flow measuring equip. and other info. deemed necessary to modify permit to incorporate NFMF categorical stds. (40 CFR 471)

Notes: 07/16/90 - Agreed Jgmt.

- 06/07/91 - Inspection - T.H. & B.F. - said they were exploring alternative flow measurement methods

08/09/91 - Ltr. ltr. requiring that CMW comply w/ A.J. of 7/16/90 by 10/31/91 and to submit a plan of action by 9/13/91.

11/91 - Decision made to write permit w/ current information and estimations since CMW has not complied w/ requirements of A.J.

ITY OF INDIANAPOLI

MARION COUNTY, INDIANA

WILLIAM H. HUDNUT, III
MAYOR

WILLIAM C. UHASSERE
DIRECTOR

ROBERT F. HOLM, Ph.D.
ADMINISTRATOR

317-633-5476
FAX: 317-685-0026

DEPARTMENT OF PUBLIC WORKS
WATER AND LAND PROTECTION DIVISION
2700 SOUTH BELMONT AVENUE
INDIANAPOLIS, IN 46221

August 9, 1991

CERTIFIED MAIL

Mr. Will Hamilton
Director, Plant Engineering
Contacts Metals Welding, Inc.
P.O. Box 2266
Indianapolis, Indiana 46206

Re: Flow Measuring Equipment

Dear Mr. Hamilton:

On July 16, 1990, an Agreed Judgment and Fine was settled between the City of Indianapolis and CMW, Inc., which required CMW to provide information deemed necessary to draft and issue a modified Industrial Discharge Permit incorporating standards promulgated in 40 CFR 471 - Nonferrous Metals Forming Point Source Category. CMW further agreed to install some method of flow measurement to determine discharge volume.

On June 7, 1991, Messrs. Tim Heider and Bob Frye of this office met with you to determine compliance with this Agreed Judgment, at which time you indicated that alternative flow measuring methods were being investigated. No further information regarding this matter has been received by this office. To prevent further enforcement action, CMW, Inc., must comply with the requirements of the Agreed Judgment of July 16, 1990, by October 31, 1991. A plan of action should be submitted to this office by September 15, 1991.

If you have any questions, please contact Mr. Tim Heider at 633-5568.

Sincerely,

Robert Holm

Robert F. Holm, Ph.D.
Administrator
Water and Land Protection Division

RFH/sea

cc: Robert K. Rawlings, P.E., Mgr., Industrial Surveillance Sec.
Tim Heider, Associate Engineer, Enforcement
Bob Frye, Enforcement Coordinator
Kristen Gobbi-Belcredi, Associate Engineer, Permits

A Competitive and Compassionate City

RECYCLED PAPER

WATER & LAND

FACT SHEET
PERMIT MODIFICATION

CONTACTS METALS WELDING, INC.
70 South Gray Street
Indianapolis, Indiana 46206

CATEGORIZATION

This facility is regulated by 40 CFR 471 Subparts D & E (Nonferrous Metals Forming, Precious Metals and Refractory Metals, Existing Source) and 40 CFR 468 Subpart A (Copper Forming, Existing Source).

PARAMETERS SELECTED, EFFLUENT LIMITATIONS AND REGULATORY CONTROL (LOCAL, FEDERAL, ETC.)

See page 2-4 of the permit and the limitations section of this fact sheet for the parameters selected and limitations.

LIMITATIONS CALCULATION AND RATIONALE

This permit has been modified to include federal categorical limitations. All necessary data regarding flows has not been provided by the permittee as required in an Agreed Judgment. In writing this permit it is assumed all flows reported on recent self-monitoring reports are regulated flows.

This facility performs sintering, cladding, plating and alloying of powders. Some parts are tumbled and deburred. Silver extrusion is also performed.

The standards which apply to this facility are production based standards. The following information was used to calculate permit limitations.

1. Pounds Allocated for Each Pollutant
(lbs pollutant/million off-pounds)

Daily and Monthly Average limits are listed in the federal regulations for each category.

Nonferrous Metals Forming, Precious Metals limits the following parameters:

copper, cadmium, total cyanide, silver

Nonferrous Metals Forming, Refractory Metals limits the following parameters:

copper, nickel, fluoride, molybdenum

FACT SHEET (Cont.)

CONTACT METALS WELDING, INC.
70 South Gray Street
Indianapolis, Indiana 46206

Copper Forming limits the following parameters:

copper, nickel, total chromium, lead, zinc, oil & grease

Metals which had allocations in more than one category were summed (i.e., copper and nickel).

2. Categorical Standards

Weight Allocations for the various pollutants were given for the following processes:

a. Nonferrous Metals Forming, Precious Metals, Existing Source

-Heat treatment contact cooling water (40 CFR 471.44(g))
-Direct chill casting contact cooling water (40 CFR 471.44(j))
-Shot casting contact cooling water (40 CFR 471.44(k))
-Surface treatment baths (40 CFR 471.44(n))
-Surface treatment rinse (40 CFR 471.44(o))
-Alkaline cleaning spent baths (40 CFR 471.44(p))
-Alkaline cleaning rinse (40 CFR 471.44(q))
-Tumbling and burnishing wastewater (40 CFR 471.33(s))
-Sawing or grinding spent emulsions (40 CFR 471.44(u))

b. Nonferrous Metals Forming, Refractory Metals, Existing Source

-Surface treatment baths (40 CFR 471.54(l))
-Surface treatment rinse (40 CFR 471.54(m)
-Alkaline cleaning spent baths (40 CFR 471.54(n))
-Alkaline cleaning rinse (40 CFR 471.54(o))
-Molten salt (40 CFR 471.54(p))
-Tumbling or burnishing wastewater (40 CFR 471.54(q))
-Sawing or grinding contact cooling water (40 CFR 471.54(t))
-Sawing or grinding rinse (40 CFR 471.54(u))
-Miscellaneous wastewater source (40 CFR 471.54(w))

c. Copper Forming, Existing Source

-Drawing spent lubricant (40 CFR 468.14(c))
-Annealing with water (40 CFR 468.14(f))
-Alkaline cleaning rinse (40 CFR 468.14(h))
-Alkaline cleaning bath (40 CFR 468.14(j))
-Tumbling or burnishing (40 CFR 468.14(o))
-Surface coating (40 CFR 468.14(p))
-Miscellaneous wastestreams (40 CFR 468.14(q))

FACT SHEET (Cont.)

CONTACTS METALS WELDING, INC.
70 South Gray Street
Indianapolis, Indiana 46206

3. Production Rates

Production rates were provided as pounds of metal produced for 238 production days. Weights were reported as off pounds precious metals, refractory metals or copper processed as necessary for each subpart of the federal regulations.

4. Flow Rate

Flow data from December 1990 to November 1991 were averaged for each of three effluent points.

Average flow was:

Outfall 1 - 33,492 gpd
Outfall 2 - 20,095 gpd
Outfall 3 - 13,397 gpd

5. Formula to Calculate Concentration Based Permit Limitations

Permit Limitation is mg/l = (pounds allocated)/(8.34 x Flow rate in MGD)

6. Permit Limitations

None of the pollutant limits calculated are superseded by local limits. All calculated federal limits apply directly to the three outfalls. The local limit for pH was also included.

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

...SUBMIT THIS ...OF THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230103 MONTH: 8 YEAR: 92 DAILY AVERAGE FLOW : 37,466

EFFLUENT PARAMETERS	Cd 106	Cr-T 142	Cu 144	Pb 148	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 258	Oil&r 264	pH 266	Flow 295
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15
DAILY MAX	0.002	0.006	0.110	0.005	0.130	0.002	0.029	0.310	0.002	0.400	5-10	2.760
MONTHLY LIM	0.001	0.003	0.073	0.002	0.085	0.001	0.012	0.160				1.230
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l
1												
2												
3												
4												
5												
6-92											7.6	
7												
8												
9												
10												
11												
12-92	0.047	0.003	0.142	0.013	0.080	0.005	0.097	0.071	<.010	<10	7.4	2.2
13												
14												
15												
16												
17												
18												
19-92											7.4	
20												
21												
22												
23												
24												
25												
26-92	0.091	0.001	0.202	0.035	0.085	0.025	0.017	0.451	.013	<10	7.5	2.4
27												
28												
29												
30												
31												
MTHLY AVG	0.069	0.002	0.172	0.024	0.040	0.015	0.057	0.261		<10	7.5	2.3
WEST WEL	0.091	0.001	0.202	0.035	0.052	0.025	0.097	0.451	.013	<10	7.6	2.4

Received Dept. Public Works Water & Land Protection OCT 1992

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent: Ronald A. McClannan Date: 9/25/92

INDUSTRIAL DISCHARGE PERMIT
Self-Monitoring Report

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230102 MONTH: 8 YEAR: 92 DAILY AVERAGE FLOW : 50.629

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 184	Zn 190	Mo 192	CN-T 250	O&Gr 264	pH 266	Flow 295			
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP			
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15			
DAILY MAX	0.001	0.005	0.070	0.002	0.005	0.001	0.020	0.200	0.001	0.270	5-10	1.060			
MONTHLY LIM		0.002	0.047	0.001	0.056		0.008	0.110				0.110			
DATE/UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l			
1															
2															
3															
4															
5															
8-6-92	0.002	0.001	0.058	0.035	0.050	0.017	0.051	0.047	<.010	<10	7.1	1.0			
7															
8															
9															
10															
11															
8-12-92											7.6				
13															
14															
15															
16															
17															
18															
8-19-92											7.6				
20															
8-21-92	0.033	0.004	0.117	0.028	0.039	0.019	0.014	0.047	<.010	<10		1.2			
22															
23															
24															
25															
8-26-92											7.9				
27															
28															
29															
30															
31															
MONTHLY AVE	0.018	0.002	0.088	0.016	0.049	0.018	0.052	0.047	<.010	<10	7.5	1.1			
HIGHEST VAL	0.033	0.002	0.117	0.028	0.050	0.019	0.051	0.047	<.010	<10	7.9	1.2			

Received OCT 1992 DPW Water & Land Protection

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent: Ronald A. McClemon Date: 9/25/92

Self-Monitoring Report

FORM BY THE 28th OF NEXT MONTH
TO THE FOLLOWING ADDRESS:

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230101 MONTH: 8 YEAR: 92 DAILY AVERAGE FLOW : 13,164

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 258	O&Gr 264	pH 266	Flow 293			
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	Comp			
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15			
DAILY MAX	0.000	0.003	0.062	0.001	0.051	0.001	0.012	0.120	0.000	0.160	5-10	1.11			
MONTHLY LIM		0.001	0.029	0.001	0.034		0.004	0.064							
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	MG/L			
1															
2															
3															
4															
5															
6-92											7.7				
7-92	0.036	0.002	3.900	0.040	2.962	0.087	0.089	0.111	<0.010	<10		1.7			
8															
9															
10															
11															
12-92											8.0				
13															
14															
15															
16															
17															
18															
19-92	0.276	0.006	0.969	0.057	0.357	0.046	0.117	0.035	<0.010	<10	7.6	.99			
20															
21															
22															
23															
24															
25															
26-92											7.7				
27															
28															
29															
30															
31															
MONTHLY AVG	0.054	0.004	1.430	0.049	1.654	0.056	0.103	0.077	<0.010	<10	7.7	1.345			
HIGHEST VAL	0.276	0.006	3.900	0.057	2.962	0.087	0.089	0.111	<0.010	<10	8.0	1.7			

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent Ronald A. McClamrock Date: 9/25/92

INDUSTRIAL DISCHARGE PERMIT
Self-Monitoring Report

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230103 MONTH: 9 YEAR: 92 DAILY AVERAGE FLOW : 37,506

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 198	Mo 192	CN-T 236	O&Gr 264	pH 266	Fluo 295
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15
DAILY MAX	0.002	0.008	0.110	0.065	0.130	0.002	0.029	0.310	0.002	0.400	5-10	2.700
MONTHLY LIM	0.001	0.005	0.073	0.032	0.085	0.001	0.012	0.160				1.230
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l
1												
2												
9-3-92											7.4	
4												
5												
6												
7												
8												
9												
9-10-92	0.047	0.001	0.157	0.061	0.143	0.003	0.044	0.140	.037	<10	7.6	2.8
11												
12												
13												
14												
15												
9-16-92											7.5	
17												
18												
19												
20												
21												
9-22-92											7.7	
23												
24												
25												
26												
27												
28												
29												
9-30-92	0.052	0.001	0.130	0.049	0.028	0.008	0.105	0.042	<.010	<11	7.3	1.1
31												
MONTHLY AVG	0.049	0.001	0.143	0.055	0.085	0.005	0.075	0.091		<10	7.5	1.9
HIGHEST VAL	0.052	0.001	0.157	0.061	0.143	0.008	0.105	0.140	.037	<10	7.7	2.8

OCT 1992 Received DPW Water & Land Protection

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent: Donald A. McAlmon Date: 10/26/92

INDUSTRIAL DISCHARGE PERMIT
Self-Monitoring Report

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230102 MONTH: 9 YEAR: 92 DAILY AVERAGE FLOW : 50,684

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 198	Mo 192	CN-T 256	O&Gr 264	pH 266	Flow 293				
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP				
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15				
DAILY MAX	0.001	0.005	0.070	0.002	0.085	0.001	0.020	0.200	0.001	0.270	5-10	1.840				
MONTHLY LIM		0.002	0.049	0.001	0.056		0.008	0.110				0.110				
DATE/UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l				
1																
2																
9-3-92											7.8					
4																
5																
6																
7																
9-8-92	0.001	0.002	0.081	0.034	0.012	0.011	0.050	0.086	.012	<10		1.1				
9																
9-10-92											7.8					
11																
12																
13																
14																
15																
9-14-92											7.5					
17																
9-18-92	0.029	0.001	0.080	0.030	0.017	0.051	0.210	0.001	1.2	<13		1.1				
19																
20																
21																
9-22-92											7.7					
23																
24																
25																
26																
27																
28																
29																
9-30-92											7.4					
31																
MONTHLY AVG	0.015	0.002	0.081	0.032	0.019	0.031	0.130	0.043	.606	<12	7.6	1.1				
HIGHEST VAL	0.061	0.002	0.081	0.034	0.017	0.051	0.210	0.086	1.2	<13	7.8	1.1				

Oct 1992 Received Dept. Water & Land Protection

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent Ronald A. McClamon Date: 10/20/92

Self-Monitoring Report

FORM BY THE 28th OF NEXT MONTH
TO THE FOLLOWING ADDRESS:

CONTRACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230101 MONTH: 9 YEAR: 92 DAILY AVERAGE FLOW : 13,178

EFFLUENT PARAMETERS	Oil 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 256	BOD 264	pH 266	Flow 273			
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	Comp			
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15			
DAILY MAX	0.000	0.003	0.062	0.001	0.051	0.001	0.012	0.120	0.000	0.160	5-10	1.11			
MONTHLY LIM		0.001	0.029	0.001	0.034		0.004	0.064							
DENSITY	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/L			
1															
9-2-92	0.043	0.002	0.699	0.056	0.117	0.114	0.069	0.063	.017	< 10		1.1			
9-3-92											7.6				
4															
5															
6															
7															
8															
9															
9-10-92											7.5				
11															
12															
13															
14															
15															
9-16-92	0.048	0.002	0.705	0.046	0.017	0.020	0.079	0.080	<.010	< 13	7.7	0.90			
17															
18															
19															
20															
21															
9-22-92											7.9				
23															
24															
25															
26															
27															
28															
29															
9-30-92											7.5				
31															
MONTHLY AVG	0.043	0.002	0.702	0.051	0.070	0.070	0.071	0.071	.	< 12	7.6	1.0			
HIGHEST VAL	0.048	0.002	0.705	0.056	0.117	0.121	0.079	0.080	.017	< 13	7.9	1.1			

Received
Water & Land Pollution

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Agent Ronald A. McClamrock Date: 10/20/92

INDUSTRIAL DISCHARGE PERMIT
Self-Monitoring Report

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230103 MONTH: 10 YEAR: 92 DAILY AVERAGE FLOW : 27,465

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 258	O&Gr 264	pH 266	Flow 293				
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP				
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15				
DAILY MAX	0.002	0.008	0.110	0.003	0.130	0.002	0.029	0.310	0.002	0.400	5-10	2.760				
MONTHLY LIM	0.001	0.005	0.073	0.002	0.085	0.001	0.012	0.160				1.230				
DATE/UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l				
1																
2																
3																
4																
5																
6																
7																
8																
10-9-92	0.248	0.005	0.131	0.019	0.074	0.001	0.066	0.300	<.010	<10	8.0	1.4				
10																
11																
12																
13																
10-14-92											7.7					
15																
16																
17																
18																
19																
20																
10-21-92	0.049	0.008	0.132	0.036	0.126	0.001	0.038	0.09	.020	<10	7.7	.89				
22																
23																
24																
25																
26																
10-27-92											7.7					
28																
29																
30																
31																
MONTHLY AVG	0.148	0.006	0.131	0.027	0.100	0.001	0.052	0.150		<10	7.8	1.14				
HIGHEST VAL	0.248	0.008	0.132	0.036	0.126	0.001	0.066	0.300	.020	<10	8.0	1.4				

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent R.A. McQuown Date: 11/10/92

INDUSTRIAL DISCHARGE PERMIT
Self-Monitoring Report

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTRACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230102 MONTH: 10 YEAR: 92 DAILY AVERAGE FLOW : 37,116

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 258	O&Gr 264	pH 266	Flow 293			
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP			
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15			
DAILY MAX	0.001	0.005	0.070	0.002	0.085	0.001	0.020	0.280	0.001	0.270	5-10	1.840			
MONTHLY LIM		0.002	0.009	0.001	0.056		0.008	0.110				0.110			
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l			
1															
2															
3															
4															
5															
6															
7															
10-8-92	0.051	0.002	0.122	0.018	0.050	0.114	0.086	0.094	<.010	<10		1.1			
10-9-92											7.6				
10															
11															
12															
13															
10-14-92											7.5				
15															
10-16-92	0.069	0.001	0.083	0.041	0.364	0.034	0.065	0.001	.010	<10		.71			
17															
18															
19															
20															
10-21-92											7.7				
22															
23															
24															
25															
26															
10-27-92											7.9				
28															
29															
30															
31															
MONTHLY AVG	0.051	0.001	0.102	0.030	0.207	0.074	0.075	0.047		<10	7.7	.90			
HIGHEST VAL	0.069	0.002	0.122	0.041	0.364	0.114	0.086	0.094	.010	<10	7.9	1.1			

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent: [signature] Date: 11/16/92

Self-Monitoring Report

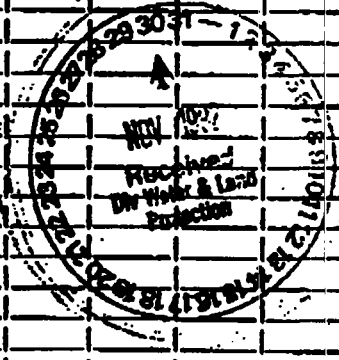
CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

FORM BY THE 28th OF NEXT MONTH
TO THE FOLLOWING ADDRESS:

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230101 MONTH: 10 YEAR: 92 DAILY AVERAGE FLOW : 9,650

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 256	O&Gr 264	pH 266	Fluo 293			
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP			
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15			
DAILY MAX	0.000	0.003	0.042	0.001	0.051	0.001	0.012	0.120	0.000	0.160	5-10	1.11			
MONTHLY LIM		0.001	0.029	0.001	0.034		0.004	0.064							
DATE/UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/L			
1															
2															
3															
4															
5															
10-6-92	0.026	0.006	0.152	0.100	0.050	0.037	0.102	0.142	.018	<10		.89			
7															
8															
10-9-92											7.5				
10															
11															
12															
13															
10-14-92	0.057	0.016	5.13	0.063	2.63	0.113	0.857	0.932	.10	<10	7.1	2.0			
15															
16															
17															
18															
19															
20															
10-21-92											7.8				
22															
23															
24															
25															
26															
10-27-92											7.9				
28															
29															
30															
31															
MONTHLY AVG	0.040	0.011	2.64	0.081	1.456	0.075	0.429	0.087	.059	<10	7.6	1.49			
HIGHEST VAL	0.057	0.016	5.13	0.100	2.63	0.113	0.857	0.142	.10	<10	7.9	2			



I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent R. A. M. Clemens Date: 11/16/92

Self-Monitoring Report

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTRACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230103 MONTH: 11 YEAR 92 DAILY AVERAGE FLOW : 30428

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Se 192	Cr-T 238	Cr6+ 264	pH 266	Flow 283		
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP		
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15		
DAILY MAX	0.002	0.006	0.110	0.005	0.130	0.002	0.027	0.310	0.002	0.400	5-10	2.760		
MONTHLY LIM	0.001	0.003	0.073	0.002	0.005	0.001	0.012	0.100				1.230		
DAILY UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l		
1														
2														
3														
11-4-92											7.1			
5														
6														
7														
8														
9														
10														
11														
12														
11-13-92	0.008	0.001	0.041	0.049	0.018	0.011	0.085	0.009	<.010	<10	7.4	<.50		
14														
15														
16														
17														
11-18-92											7.1			
19														
20														
21														
22														
23														
11-24-92	0.008	0.007	0.057	0.110	0.147	0.014	0.055	0.028	.014	<10	7.6	.81		
25														
26														
27														
28														
29														
30														
31														
MONTHLY AVG	0.008	0.004	0.053	0.079	0.082	0.012	0.070	0.019		<10	7.4			
HIGHEST VAL	0.008	0.007	0.057	0.110	0.147	0.014	0.055	0.028	.014	<10	7.6	.81		

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Agent: R.A. McClamrock Date: 12-23-92

JAN 1993 RECEIVED Dpt Water & Land Protection

APR-06-1993 11:35 FROM DPW-ERMD-APCS TO 913125531406 P.09

... MONITORING REPORT

... SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230102 MONTH: *11* YEAR: *92* DAILY AVERAGE FLOW : *33864*

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 238	O&Gr 264	pH 266	Fluo 293		
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP		
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15		
DAILY MAX	0.001	0.005	0.078	0.002	0.085	0.001	0.020	0.288	0.001	0.270	5-10	1.840		
MONTHLY LIM		0.002	0.049	0.001	0.056		0.008	0.110				0.110		
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l		
1														
2														
3														
11-4-92											*7.2*			
5														
6														
7														
8														
9														
11-10-92	*0.041*	*0.001*	*0.175*	*0.028*	*0.400*	*0.008*	*0.071*	*0.001*	*<.010*	*<10*		*1.1*		
11														
12														
11-13-92											*7.0*			
14														
15														
16														
17														
11-18-92											*7.2*			
19														
11-20-92	*0.094*	*0.033*	*0.375*	*0.061*	*0.713*	*0.012*	*0.005*	*0.044*	*<.010*	*<10*		*.87*		
21														
22														
23														
11-24-92											*7.3*			
25														
26														
27														
28														
29														
30														
31														
MONTHLY AVG	*0.067*	*0.017*	*0.275*	*0.044*	*0.556*	*0.010*	*0.038*	*0.022*	*<.010*	*<10*	*7.2*	*.98*		
HIGHEST VAL	*0.094*	*0.033*	*0.375*	*0.061*	*0.713*	*0.012*	*0.071*	*0.044*	*<.010*	*<10*	*7.3*	*1.1*		

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent *R.A. McClamroch* Date: *12-23-92*

JAN 1993 Received Div Water & Land Protection

317 327 2274 PAGE.009

APR 6 '93 10:31

Self-Monitoring Report

FORM BY THE 20th OF NEXT MONTH
TO THE FOLLOWING ADDRESS:

CONTRACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230101 MONTH: 11 YEAR: 92 DAILY AVERAGE FLOW: 3386

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 258	O&Gr 264	pH 266	Fluo 297	
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	comp	
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15	
DAILY MAX	0.000	0.003	0.062	0.001	0.051	0.001	0.012	0.120	0.000	0.100	5-10	1.4	
MONTHLY LIM		0.001	0.029	0.001	0.034		0.006	0.064					
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l	
1													
2													
3													
11-4-92	0.082	0.002	1.908	0.046	4.16	0.087	0.715	0.0001	9.6	<10	6.7	.99	
5													
6													
7													
8													
9													
10													
11													
12													
11-13-92											7.1		
14													
15													
16													
17													
11-18-92	0.030	0.015	0.257	0.045	2.68	0.016	0.123	0.034	.029	<10	7.2	.62	
19													
20													
21													
22													
23													
11-24-92											7.7		
25													
26													
27													
28													
29													
30													
31													
MONTHLY AVG	0.056	0.009	1.082	0.045	3.42	0.051	0.424	0.017	4.814	<10	7.2	.80	
HIGHEST VAL	0.082	0.015	1.908	0.046	4.16	0.087	0.715	0.034	9.6	<10	7.7	.99	

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Agent R.A. McClamroch Date: 12-23-92

JAN 1993
Received
Div Water & Land
Protection

INDUSTRIAL DISCHARGE PERMIT
Self-Monitoring Report

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTACT METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230101 MONTH: 12 YEAR: 92 DAILY AVERAGE FLOW : 1184

EFFLUENT PARAMETERS	Cd 156	Cr-T 142	Cu 144	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	Cr-T 258	Cr6r 264	pH 266	Flow 293			
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	Comp			
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15			
DAILY MAX	0.000	0.003	0.042	0.001	0.051	0.001	0.012	0.120	0.000	0.160	5-10	1.11			
MONTHLY LIM		0.001	0.029	0.001	0.034		0.004	0.044				0.49			
DATE/UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/L			
1															
12-2-92	0.099	0.013	20.89	0.081	1.229	0.055	0.093	0.057	.73	<10	7.5	2.7			
3															
4															
5															
6															
7															
8															
12-9-92											6.7				
10															
12-11-92	0.080	0.001	3.62	0.079	7.76	0.005	0.122	0.071				.94			
12															
13															
14															
15															
12-16-92									.018	<10	7.4				
17															
18															
19															
20															
12-21-92											7.9				
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
MONTHLY AVG	0.089	0.007	12.25	0.080	4.49	0.035	0.107	0.065	.374	<10	7.7	1.82			
HIGHEST VAL	0.099	0.013	20.89	0.081	7.76	0.055	0.122	0.071	.73	<10	7.9	2.7			

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent: Ronald A. McClarnon Date: 1-21-93

JAN 1993
Received
Div Water & Land Protection

INDUSTRIAL DISCHARGE PERMIT
Self-Monitoring Report

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230102 MONTH: 12 YEAR: 92 DAILY AVERAGE FLOW : 28182

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 258	O&Gr 264	pH 366	Flow 255				
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP				
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15				
DAILY MAX	0.001	0.005	0.070	0.002	0.005	0.001	0.020	0.200	0.001	0.270	5-10	1.040				
MONTHLY LIM		0.002	0.049	0.001	0.054		0.008	0.110				0.110				
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l				
1																
12-2-92											7.5					
3																
4																
5																
6																
7																
8																
12-9-92	0.013	0.001	0.148	0.033	0.013	0.005	0.036	0.053	.026	<10	8.4	1.1				
10																
11																
12																
13																
14																
15																
12-16-92	0.043	0.001	0.048	0.059	0.234	0.008	0.089	0.240	.019	<10	7.4	1.3				
17																
18																
19																
20																
12-21-92											7.5					
22																
23																
24																
25																
26																
27																
28																
29																
30																
31																
MONTHLY AVG	0.028	0.001	0.098	0.046	0.123	0.005	0.062	0.146	.0225	<10	7.7	1.2				
HIGHEST VAL	0.043	0.001	0.148	0.059	0.234	0.008	0.089	0.240	.026	<10	8.4	1.3				

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent Ronald A. McClanon Date: 1-21-93

Received JAN 1993 By Water & Land Protection

INDUSTRIAL DISCHARGE PERMIT
Self-Monitoring Report

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230103 MONTH: 12 YEAR: 92 DAILY AVERAGE FLOW : 26999

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	Cl-T 250	O&Gr 264	pH 266	Flow 275				
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP				
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15				
DAILY MAX	0.002	0.008	0.110	0.003	0.130	0.002	0.039	0.310	0.002	0.400	5-10	2.760				
MONTHLY LIM	0.001	0.003	0.073	0.002	0.085	0.001	0.012	0.160				1.230				
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l				
1																
11-2-92											7.5					
3																
4																
5																
6																
7																
8																
12-9-92									.017	<10	7.0					
11-10-92	0.068	0.009	0.589	0.044	0.025	0.009	0.339	0.145				1.6				
11																
12																
13																
14																
15																
12-16-92									<.010	<10	7.5					
17																
11-18-92	0.152	0.001	0.108	0.065	0.029	0.001	0.045	0.164				1.0				
19																
20																
11-21-92											7.3					
22																
23																
24																
25																
26																
27																
28																
29																
30																
31																
MONTHLY AVG	0.110	0.005	0.334	0.054	0.027	0.005	0.192	0.161		<10	7.3	1.3				
HIGHEST VAL	0.152	0.009	0.589	0.065	0.029	0.009	0.339	0.164	.017	<10	7.5	1.6				

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent: Ronald A. McDermond Date: 1-21-93

JAN 1993
Received
Div Water & Land Protection

INDUSTRIAL DISCHARGE PERMIT
Self-Monitoring Report

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230101 MONTH: 1 YEAR: 93 DAILY AVERAGE FLOW : 1,122 gallons

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 258	HxCr 264	pH 266	Flu 293			
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP			
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15			
DAILY MAX	0.000	0.003	0.042	0.001	0.051	0.001	0.012	0.120	0.000	0.160	5-10	1.11			
MONTHLY LIM		0.001	0.029	0.001	0.034		0.004	0.064				0.49			
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/L			
1															
2															
3															
4															
5															
1-6-93	24.48	0.009	3.514	0.076	3.794	0.021	1.074	0.104			6.8	.62			
7															
8															
9															
10															
11															
12															
1-13-93									.040	<10	7.7				
14															
15															
16															
17															
18															
19															
1-20-93	0.018	0.017	0.534	0.070	0.025	0.012	0.061	0.016			7.6	.84			
21															
22															
23															
24															
25															
26															
1-27-93									.058	<10	7.9				
28															
29															
30															
31															
MONTHLY AVG	12.25	0.017	2.024	0.073	1.909	0.016	0.57	0.059			7.5				
HIGHEST VAL	24.48	0.017	3.514	0.076	3.794	0.021	1.074	0.102			7.9				

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent Ronald A. McClure Date: 2-22-93

FEB 1993 Received Div Water & Land Protection

INDUSTRIAL DISCHARGE PERMIT
Self-Monitoring Report

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

PERMIT: 36230102 **MONTH: 1** **YEAR: 93** **DAILY AVERAGE FLOW : 14019**

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 258	OilGr 264	pH 266	Flow 293			
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP			
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15			
DAILY MAX	0.001	0.005	0.070	0.002	0.085	0.001	0.020	0.200	0.001	0.270	5-10	1.840			
MONTHLY LIM		0.002	0.069	0.001	0.056		0.008	0.110				0.110			
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l			
1															
2															
3															
4															
5															
1-6-93											7.0				
7															
1-8-93	[illegible]	0.001	0.751	0.047	0.047	0.014	0.132	0.122				.81			
9															
10															
11															
12															
1-13-93									.017	<10	7.7				
14															
15															
16															
17															
18															
19															
1-20-93											7.5				
21															
1-22-93	0.064	0.008	0.413	0.049	0.217	0.023	0.089	0.103				.98			
23															
24															
25															
26															
1-27-93									.052	<10	7.6				
28															
29															
30															
31															
MONTHLY AVG	0.303	0.005	0.532	0.048	0.171	0.001	0.110	0.113			7.4				
HIGHEST VAL	0.541	0.008	0.751	0.049	0.217	0.023	0.132	0.123			7.7				

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent Ronald A. McLarnon Date: 2-22-93

4 FEB 1993 Received Dir Water & Land Protection

Self-Monitoring Report

PLEASE COMPLETE AND SUBMIT THIS FORM BY THE 28th OF NEXT MONTH TO THE FOLLOWING ADDRESS:

CONTACTS METALS WELDING INC.
70 SOUTH GRAY STREET
INDIANAPOLIS , IN 46201

Department of Public Works
Water & Land Protection Division
2700 South Belmont Avenue
Indianapolis, Indiana 46221

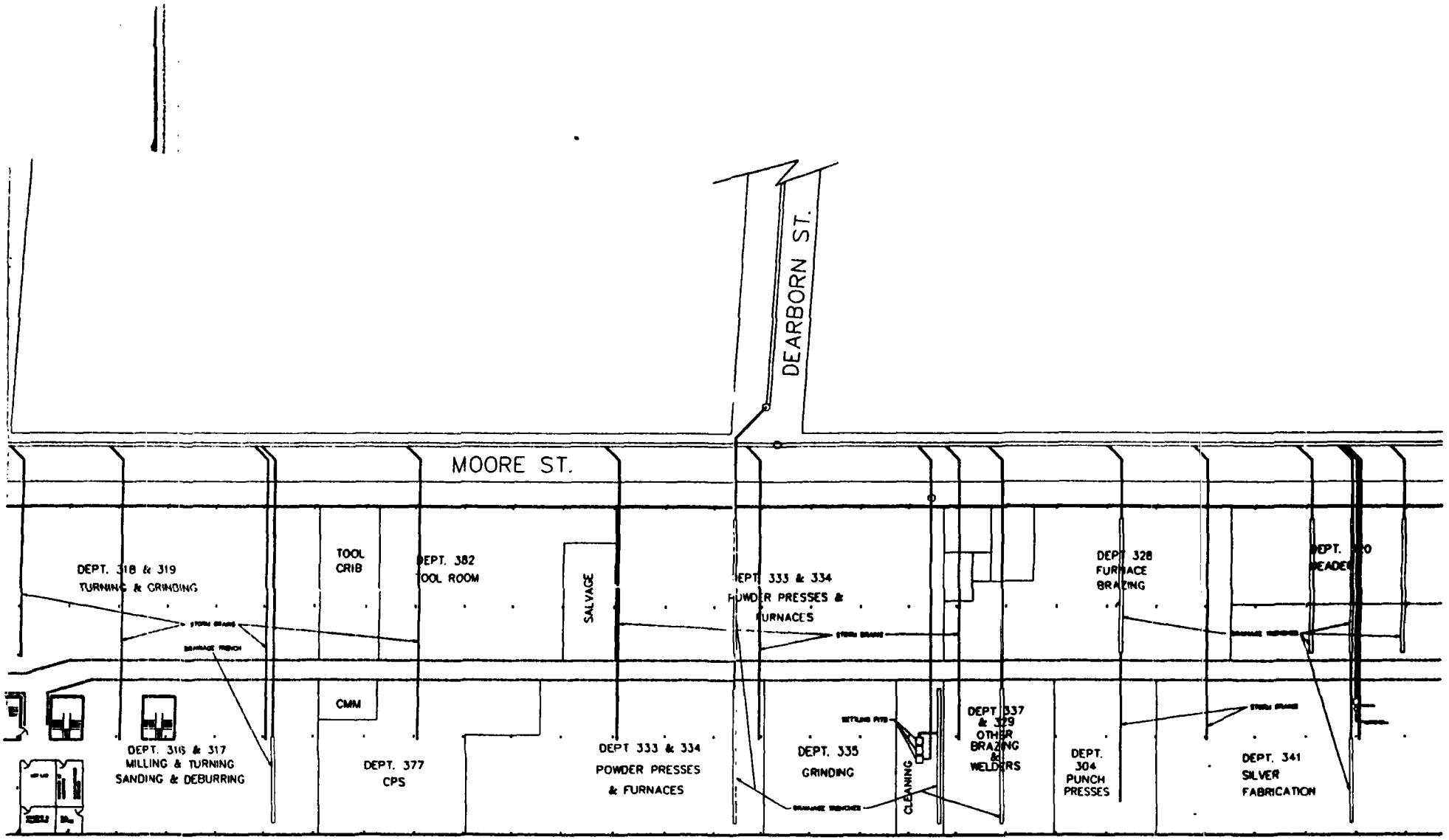
PERMIT: 36230103 MONTH: 1 YEAR: 93 DAILY AVERAGE FLOW : 12897

EFFLUENT PARAMETERS	Cd 156	Cr-T 162	Cu 164	Pb 168	Ni 176	Ag 186	Zn 190	Mo 192	CN-T 250	O&Gr 264	pH 266	Flow 295			
SAMPLE TYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	GRAB	GRAB	GRAB	COMP			
FREQUENCY	15	15	15	15	15	15	15	15	15	15	7	15			
DAILY MAX	0.002	0.008	0.110	0.083	0.130	0.002	0.029	0.310	0.002	0.400	5-10	2.760			
MONTHLY LIM	0.001	0.085	0.073	0.002	0.085	0.001	0.012	0.160				1.230			
DATE\UNIT	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l			
1															
2															
3															
4															
5															
1-6-93											7.1				
7															
8															
9															
10															
11															
12															
1-13-93									.012	<10	7.7				
1-14-93	0.059	.001	0.158	0.046	0.019	0.015	0.076	0.001				.90			
15															
16															
17															
18															
19															
1-20-93											7.3				
21															
22															
23															
24															
25															
26															
1-27-93	0.059	0.015	0.249	0.065	0.205	0.084	0.033	0.030	.052	<10	7.8				
28															
29															
30															
31															
MONTHLY AVG	0.059	0.008	0.202	0.055	0.111	0.049	0.054	0.015			7.3				
HIGHEST VAL	0.059	0.015	0.247	0.065	0.203	0.084	0.076	0.030			7.8				

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violations.

Signature of Authorized Agent Ronald A. McClanan Date: 2-22-93

FEB 1993 Received Div Water & Land Protection


DEARBORN ST.
MOORE ST.
DEPT. 318 & 319
TURNING & GRINDING
TOOL
CRIB
DEPT. 382
TOOL ROOM
SALVAGE
DEPT. 333 & 334
POWDER PRESSES &
FURNACES
DEPT. 328
FURNACE
BRAZING
DEPT.
HEADER
CMM
DEPT. 316 & 317
MILLING & TURNING
SANDING & DEBURRING
DEPT. 377
CPS
DEPT 333 & 334
POWDER PRESSES
& FURNACES
DEPT. 335
GRINDING
CLEANING
DEPT. 337
& 329
OTHER
BRAZING
&
WELDERS
DEPT.
304
PUNCH
PRESSES
DEPT. 341
SILVER
FABRICATION

APPENDIX F

INDUSTRIAL AND COMMERCIAL WELL LOGS

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

662
on map.

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: Marion Civil Township: Center

Congressional township: 15 N Range: 4 E Number of section: 2

(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: Go southeastern ave Pass citizens gas and Under the Rail road under pass 1st Bldg on south side street

Pfeiffer Body Shop

Name of owner: Howard Pfeiffer Address: 3405 Southeastern ave

Name of Well Drilling Contractor: Paul Gullion

Address: 2055 N. Irwin St

Name of Drilling Equipment Operator: Paul Gullion.

INFORMATION ON THE WELL

Completed depth of well: 123 ft. Date well was completed: July 10 1963

Diameter of outside casing or drive pipe: 4" galv Length: 98'

Diameter of inside casing or liner: ______ Length: ______

Diameter of Screen: ______ Length: ______ Slot size: ______

Type of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other ______

Use of Well: For home ☐ For industry ☑ For public supply ☐ Stock ☐

Method of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

Static water level in completed well (Distance from ground to water level) 47 ft.

Bailer Test: Hours tested 1 Rate 10 g.p.m. Drawdown none ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested 6 Rate 15 g.p.m. Drawdown 1" ft.

Signature Paul Gullion

Date July 10 1963

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

66 C
on map

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Kroger Baking Co
Between English & Southeastern Ave.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Kroger Baking Co Address Indianapolis

Building Contractor Address

Name of Well Drilling Contractor: Acme Drilling Co

Address

Name of Drilling Equipment Operator: Kost.

WELL INFORMATION

Depth of well: 237 Date well was completed: 6-10-53

Diameter of casing or drive pipe: 6 in Total Length: 90

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: Slot Size:

Type of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

Use of Well: For Home [ ] For Industry [X] and air For Public Supply [ ] Stock [ ]

Method of Drilling: Cable Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) 40 ground level feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate lot g.p.m. 80 Drawdown - ft.

(Drawdown is the difference between static level and water level at end of test)

7½ hp. turbine

Signature Old log Card citing Drillers

Date by Steen - 1-8-57.

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET 2-10-93

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Well deepened from 73		
Sand	73	78
Mud	78	90
New Albany Shale	90	105
x Limestone	105	200
x Sandy Lime	200	230
x Gray Lime	230	23[illegible]

755
105
650 Dev. Ls. Top

Tops 400

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY Marion TWP. 15 N RGE. 4 E NW ¼ NW ¼ SE ¼ SEC 8 Subdivision Name (Kost)

Topo Map Indpls East 7.5 ____ Ft W of EL. Ground Elevation 755.5

Field Located By ____ Date ____ Ft N of SL. Depth to bedrock 90

Courthouse Location By ____ Date ____ Ft E of WL. Bedrock elevation 665

Location accepted w/o verification by ____ Ft S of NL. Aquifer elevation ____ Lot Number ____

[illegible]

Tops for [illegible]

(A)

Layne NORTHERN COMPANY
A DIVISION OF LAYNE WESTERN CO.
INDIANAPOLIS

☐ TEST
☒ PERMANENT

Job No. NA-1477

WELL LOG No. 80-A CITY Indianapolis County Marion

Owner Mallory - East Washington St. Township

3029 EAST WASHINGTON STREET Section

Location State Indiana

From Land Description

From Street or Road

FORMATION FOUND – DESCRIBE FULLY.	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Asphalt pavement	0	6"		
Cinders	6"	3'		
White fill sand and fine cinders	3'	5'		
Brown sandy clay (probably fill)	5'	15'		
Large boulder followed by grey clay	15'	24'		
Medium sand (trace of oil)	24'	30'		
Medium sand and fine gravel	30'	36'		
Grey gravelly clay	36'	40'		
Monitoring water				

Hole 10 "Dia Drilled by: { Cable Tool ____ Rotary X Jetting ____
Reverse Circ. ____ Bucket ____ Auger ____

Rotary Hole Grouted: Neat Cement ____ Drilling Mud ____ Other 12" of asphalt

Casing 6 "OD From 36 "above ground to 7 feet below ground. Weight PVC Pounds per foot

Screen 6 "Set from 7' to 37 feet Make Timco Type PVC Slot ____

Pumping test ____ GPM drowdown to ____ feet after ____ hours pumping

80-A
MONITORING WELL

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY MARION TWP. 15N RGE. 4E ¼ SE ¼ SW SEC 5 Subdivision Name

Topo Map INDIANAPOLIS EAST 7½ ____ Ft W of EL. Ground Elevation ____ LAWE-NORTHERN

Field Located By ____ Date ____ ____ Ft N of SL. Depth to bedrock ____ 1980

Courthouse Location By ____ Date ____ ____ Ft E of WL. Bedrock elevation ____ ____

Location accepted w/o verification by BRUNS 10-3-80 ____ Ft S of NL. Aquifer elevation ____ Lot Number ____

WATER WELL LOG

To	From	FORMATIONS (Color, type of material, hardness, etc.)

T15N, R4E SE ¼, SE ¼, SW ¼

5 (B)

LAYNE-NORTHERN COMPANY

INCORPORATED

MISHAWAKA, INDIANA

WELL LOG No. 3 City Indianapolis County [illegible]

Township [illegible]

Owner P. R. Mallory Company Section

State Indiana

Location of Well Entrance S.E. corner parking lot Morris & Gray Sts.

FORMATION FOUND	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	STATIC WATER LEVEL	TEMP.	REMARKS
clay	19	19			
clay, muck and gravel	6	25			
hard clay and gravel	22	47			
sand and gravel	8	55	35		
clay	6	61			
gravel and sand	4	65	35		
coarse sand	2	67	35		
gravel and sand	8	75	35		
coarse sand and gravel	7	82			
coarse gravel	6	88	35		
clay	12	100			
fine sand	2 ±	102	35		
soft clay	3	105			
fine sand	2	107	35		
hard shaley clay	4	111			
shale					

Date Started Aug 27, '35 Finished August 30, '35 W. D. Nichols and E. Young

DRILLER

(SKETCH OF LOCATION ON BACK OF THIS LOG SHEET)

T15N R4E NE, NE, NW Sec. 8

LAYNE-NORTHERN COMPANY

INCORPORATED

MISHAWAKA, INDIANA

(C)

WELL LOG No. 2 City Indianapolis County Marion

Township Center

Owner P. R. Mallory and Company Section [illegible]

State Indiana

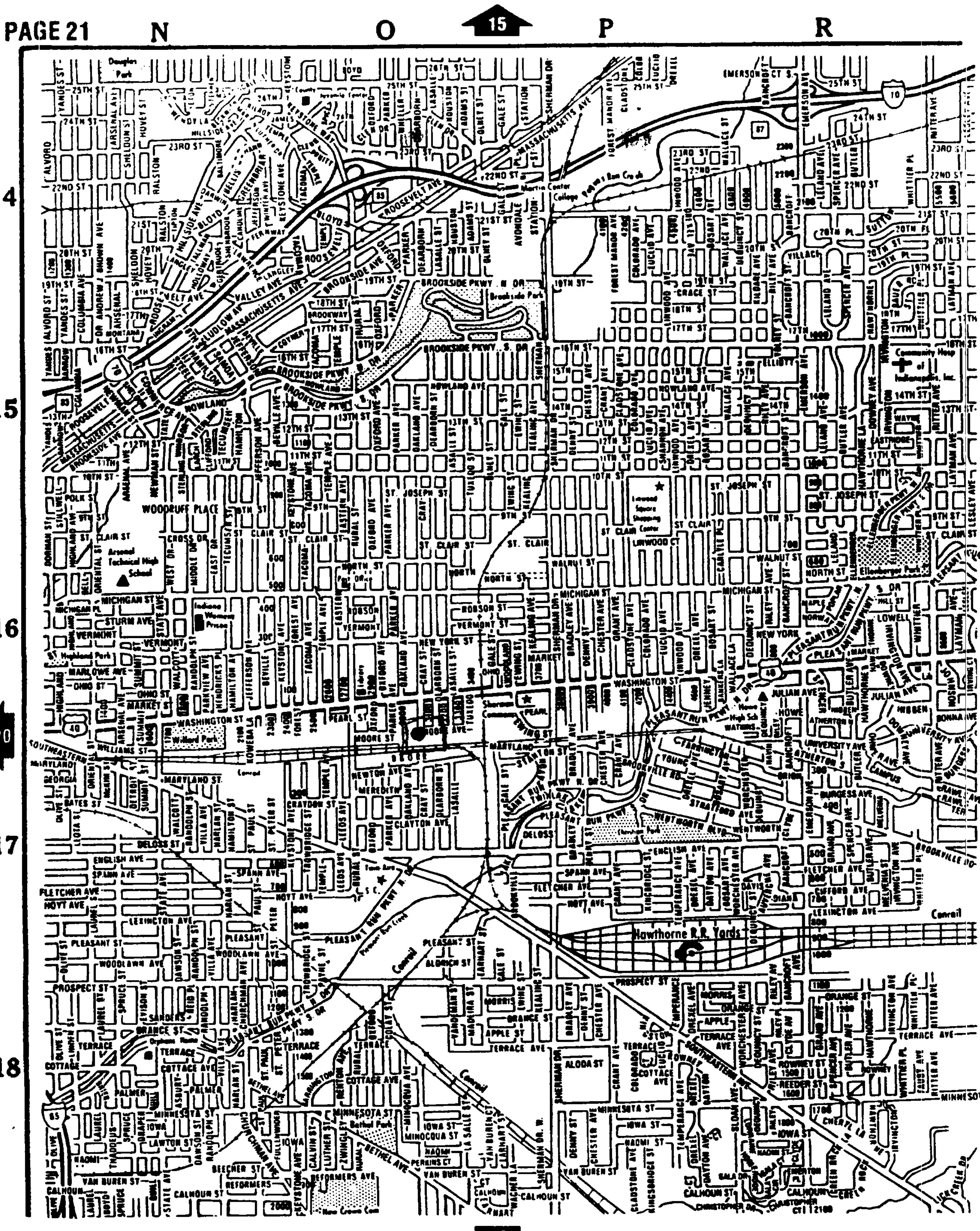
Location of Well 17' N. of E. property line, and 22' N. of S. property line.

FORMATION FOUND	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	STATIC WATER LEVEL	TEMP.	REMARKS
cinder fill	2	2			
gritty clay	51	53			
gravel	1	54			
gravelly clay	2	56			
gritty clay	17	73			
gravel	1	74			
gravelly clay	6	80			
sand and gravel	3	83			
gritty clay	25	108			
sand and gravel	1	109			
hard gritty clay	6	115			
hard shale	4	119			
hard limestone	44	163			
soft limestone	94	257			with crevices
hard limestone	83'8"	340'8"	71	54°	

Date Started April 25, '40 Finished April 24, '40 William Wagner

DRILLER

(SKETCH OF LOCATION ON BACK OF THIS LOG SHEET)



Approximate location of high capacity well. 340' deep.
Average withdraw in 1991 (monthly) 3.3×10^6 gallons
Total withdraw capability - 450 gpm

T15N R4E SE 1/4, SW 1/4, NE 1/4 Sec. 5.

LAYNE-NORTHERN COMPANY

Incorporated

MISHAWAKA, INDIANA (D)

Permanent
WELL LOG No. 6 CITY Indianapolis County Marion

Owner Radio Corporation of America Victor Township Center

Well No. 6 501 N. LaSalle St. Section

Location N.E. corner of warehouse #7 and approx. 50' west of Belt Railroad tracks. State Indiana

From Land Description ft. East and ft. North of SW Corner of Section.

From Street or Road

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Fill	0	4	4	
Clay	4	62	58	
Gravel	62	65	3	
Gritty clay	65	85	20	
Gravel (cloudy)	85	100	15	
Tough clay	100	130	30	
Gray limestone	130	240	110	
Blue shale	240	280	40	
Gray limestone	280	402	122	80
Blue shale	402	405	3	

12 inch diameter hole drilled by ☑ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole 132'

Date Started May 26, 1947 Finished July 5, 1947 James Ness
DRILLER

15-4-5 SE, SW, NE

LAYNE-NORTHERN COMPANY

INCORPORATED

MISHAWAKA, INDIANA

(E)

Test

WELL LOG No. 1 City Indianapolis County Marion

Township

Owner Radio Corporation of America Section 5

State Indiana

Location of Well N.E. corner of property

FORMATION FOUND	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	STATIC WATER LEVEL	TEMP.	REMARKS
hard pan	22	22			
clay	49	71			
muddy sand	2	73	26		
sand and gravel	13	86	26		
coarse sand	7	93	26		
clay at 93'					

Date Started May 6, '39 Finished May 10, '39 Charles Nimble

DRILLER

(SKETCH OF LOCATION ON BACK OF THIS LOG SHEET)

LAYNE-NORTHERN COMPANY

INCORPORATED

MISHAWAKA, INDIANA

(F)

WELL LOG No. 1 City Indianapolis County Marion

Township

Owner P. R. Mallory and Company Section

State Indiana

Location of Well 51 steps N. from N.E. water tower and 9 steps E. of N. side property line.

FORMATION FOUND	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	STATIC WATER LEVEL	TEMP.	REMARKS
clay	25	25			
gravel	8	33			
clay	7	40			
hard pan	4	44			
gravel	1	45			
hard gritty clay	33	78			
soft sand clay, muck	19	97			
hard blue clay, some gravel	3	100			Very hard
fine sand some fine gravel	3	103	45		
medium gravel some fine sand	2'9"	105'9"	45		Water would bail down.
soft gritty blue clay	6'3"	112			
hard gritty blue clay	1	113			
hard brown shale rock	2'3" ~~2'2"~~	115'3"			

768
113
655

Date Started Aug 13, '35 Finished August 20, '35 James Hess and W.D. Nichols.

DRILLER

(SKETCH OF LOCATION ON BACK OF THIS LOG SHEET)

T15 R4 NE, NE, NW Sec 8

LAYNE-NORTHERN COMPANY

INCORPORATED

MISHAWAKA, INDIANA

(G)

WELL LOG No. 2 City Indianapolis County Marion

Township

Owner P. R. Mallory and Company Section

Location of Well 57 steps S. of S.W. post of water tower and 86 steps W. of W. side of gray St. sidewalk. State Indiana

FORMATION FOUND	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	STATIC WATER LEVEL	TEMP.	REMARKS
yellow grittyclay	18	18			shallow pocket of gravel
hard blue gravelly clay	8	26			
soft blue gritty clay	15	41			
medium gray sand	2	43	34		Clean and loose
coarse sand, some gravel	5	48	34		Dirty
coarse gravel	2	50	34		dirty
hard blue clay gravelly	7	57			
dirty sand, gravel	2	59			
medium sand, some gravel	4	63	30		loose, fairly clean
fine sand	3	66	30		loose, fairly clean
hard clay blue	11	77			
medium dark sand and gravel	6	~~&~~ 83	30		loose clean
coarse brown gravel	2	85	30		loose clean
coarse sand, some gravel	10	95	30		clean loose
hard brown clay	16	111			
76 42 111 65 7 -					

Date Started Aug 21, '35 Finished August 26, '35 M. D. Nichols

DRILLER

(SKETCH OF LOCATION ON BACK OF THIS LOG SHEET)

T 15N R4E NE, NE, NW Sec 8

LAYNE-NORTHERN COMPANY

INCORPORATED

MISHAWAKA, INDIANA

(H)

Permanent

WELL LOG No. 3 City Indianapolis County Marion

Township [illegible]

Owner P. R. Mallory and Company Section

State Indiana

Location of Well About six hundred (600) feet W. of #1 well.

FORMATION FOUND	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	STATIC WATER LEVEL	TEMP.	REMARKS
top soil	2	2			
gritty clay	111	113			There are strips of gravel starting at 52' to 64' and 80' to 94. None over 2' thick.
limestone	10	123			
limestone and shale	23	146			
hard limestone	20	166			
soft limestone	130	296	86		
765' 113 652					
10" pipe to 114½'					
Static water level dropped from 65' to 86'					
between 200' and 265'.					
Pumped 300 gallons at 124' pumping level.					
Water showed shale color. Plugged up to					
200' with 1½" gravel and a 4' cement plug.					
Plugged with cement to 114'. Water contined					
too much mud sulphur.					

Date Started May 29, '40 Finished June 15, '40 William Wagner

DRILLER

(SKETCH OF LOCATION ON BACK OF THIS LOG SHEET)

T 15 N R 4 E NE, NE, NW Sec 8

LAYNE-NORTHERN COMPANY

INCORPORATED

MISHAWAKA, INDIANA

(I)

Permanent

WELL LOG No. 4 City Indianapolis County arion

Township [illegible]

Owner P. R. Mallory and Company Section [illegible]

State Indiana

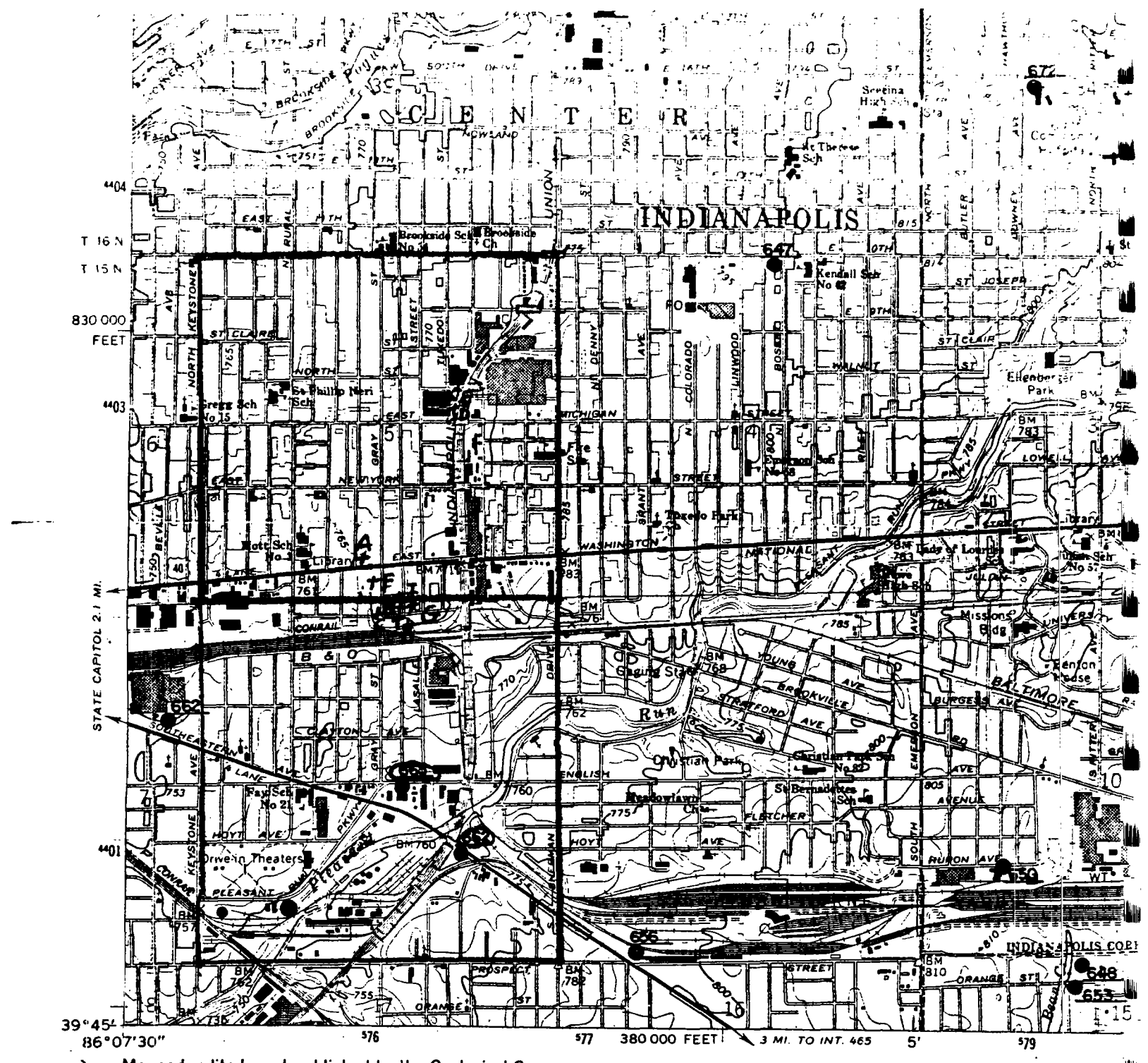
Location of Well 350' N. of #2 well, 5' in from S. property line.

FORMATION FOUND	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	STATIC WATER LEVEL	TEMP.	REMARKS
hard gritty clay	90	90			
sand and gravel	5	95			
gravelly clay	15	110			
hard shaley clay	4	114	41		
hard limestone	15	129	114		Water dropped away at 129'
hard limestone and shale	15	144			
limestone	81	222			
limestone	44	266			
Static water level 75' after liner was set.					

Date Started July 18, '40 Finished August 9, '40 William Wagner

DRILLER

(SKETCH OF LOCATION ON BACK OF THIS LOG SHEET)



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and Indiana Flood Control and Water Resources Commission

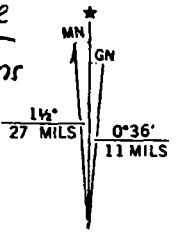
Planimetry by photogrammetric methods from aerial photographs taken 1945. Topography by planetable surveys 1946
Revised from aerial photographs taken 1966. Field checked 1967

Polyconic projection
10,000-foot grid based on Indiana coordinate system, east zone
1000-meter Universal Transverse Mercator grid ticks,
zone 16, shown in blue. 1927 North American Datum
To place on the predicted North American Datum 1983
move the projection lines 1 meter south and
1 meter west as shown by dashed corner ticks

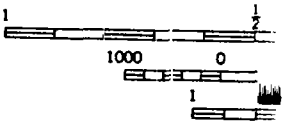
Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates areas in which only landmark buildings are shown

Well sites are approximate locations



UTM GRID AND 1980 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



USGS 7½ minute Quad map: Indianapolis East

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AND INDIANA DEPART
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